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A TREATISE

ON THE

MANUFACTURE, IMITATION, ADULTERATION, AND REDUCTION

OF

FOREIGN WINES,

BRANDIES, GINS, RUMS,

ETC. ETC.

INCLUDING

"OLD RYE" WHISKEY, "OLD RYE MONONGAHELA,"
"WHEAT," AND "BOURBON" WHISKEYS,
FANCY BRANDIES, CORDIALS, AND
DOMESTIC LIQUORS.

BASED UPON THE "FRENCH SYSTEM."

BY A PRACTICAL CHEMIST,

AND

EXPERIENCED LIQUOR DEALER.

John [illegible]

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PREFACE.

In presenting this volume to those who are in any manner engaged in the manufacture or sale of spirituous or vinous liquors, the author is confident that he has produced a practical treatise on the subject of which it treats that will prove useful to those for whom it is designed. It has been his study to combine with his own experience all the information which it was possible for him to obtain from men of practical experience and from widely-scattered sources; and to condense into a volume of small size and convenient arrangement, information which will render to every person who is pecuniarily interested in the business of which this work treats, a large equivalent for so small an outlay. Every well-informed person is aware that the adulteration of brandies, wines, etc., have been effected by the use of poisonous and deleterious compounds, to an enormous extent. This system is still in use, and will so continue until the "*French system,*" which is almost unknown in this country, will fortunately take its place,—the French system of manufacturing, *imitating*, and reducing liquors being based on scientific principles; which cause us to unite with the "pure spirit" forming the "*basis*" of all liquors, those constituents, and those only, which are found by chemical analysis to exist in the foreign liquor which we seek to imitate. The object of this work is to do away with the use of noxious and poisonous adulterations, and to instruct the purchaser how to produce brandies, wines, cordials, and other liquors, equal in every respect to any foreign importation.

Nearly all the spirits shipped to European countries from the United States undergo the same operations which are taught in this work, and are returned to this country in the form of brandies, wines, cordials, gins, etc., and are here sold at high prices.

This work, in the hands of every one engaged in any manner in the manufacture or sale of spirituous or vinous liquors, will prove exceedingly valuable; not only as a guide to instruct them in the "*arts and mysteries*" *of imitating and reducing* pure foreign brandies, wines, etc., but likewise pecuniarily beneficial, comprising as it does a larger amount of practical information and valuable formulæ, than any work of the kind ever published in the United States.

THE AUTHOR.

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WINE.

VIN, *French;* WEIN, *Germ.;* VINO, *It., Span.* WINE is the fermented juice of the grape. The strongest wines come from the Southern States of Europe. The grapes of those countries, containing a larger quantity of sugar, afford a more abundant production of alcohol; consequently, the best Sherry, Port, and Madeira are furnished from that portion of the continent. Burgundy, and other temperate climes, produce the finest-flavored wines, which cannot be done in countries farther north, in consequence of the difference of the degrees of temperature.

Wines derive their names from the different countries in which they are made: for instance, PORTUGAL produces *Port* and *Lisbon;* FRANCE, *Champagne, Burgundy, Hermitage, Vin de Grave, Sauturne,* and *Claret;* SPAIN, *Sherry, Saint-lucar, Malaga,* and *Tent;* GERMANY, *Hock* and *Moselle;* HUNGARY, *Tokay;* SICILY, *Marsala* or *Sicily Madeira,* and *Lissa;* The CAPE OF GOOD HOPE, *Constantia;* MADEIRA and the CANARIES, *Madeira* and *Teneriffe.* The wines used in the United States come almost entirely from Europe, the most extensive importations being *Port, Teneriffe, Madeira, Sherry,* and *Claret* wines of France. The art of making wines is regulated by general rules, which should not be deviated from: the grapes are gathered, placed in wooden vessels with perforated bottoms, and pressed or trodden under foot, (unless the wine-press is used,) generally in the evening, and the resulting must or juice is received in separate vats; at the end of from six to ten hours, the temperature of the air being about 60°, the fermentation gradually takes place in the must, as shown by the froth or scum which forms on the surface, and increases in thickness, caused by the more solid parts being thrown to the surface, by effervescence created by the escape of carbonic acid gas. This scum is called the *head*. After the lapse of some time this scum is removed with a skimmer, and the thin liquor returned to the vat; sometimes two or three coats are removed in this manner. When the regular vinous fermentation has begun, all the remaining froth is taken off; the liquor having acquired a strong vinous taste, and become perfectly clear, is considered formed, and is transferred into barrels. The fermentation, however, still progresses for several months longer. The precipitates form a deposit, which constitutes the wine-lees.

Grape juice does not ferment in the grape itself; this is owing to the exclusion of atmospheric oxygen, the contact of which is necessary to effect some change in the gluten, to enable it to set up the fermentating process.

The expressed juice of the grape, called *must*, (*mustum*,) is composed of the following:—

By Proust.	By Berard.
Extractive.	Odorous matter.
Sugar.	Sugar.
Gum.	Gum.
Glutinous matter.	Glutinous matter.
Malic acid.	Malic acid.
Citric acid.	Malate of lime.
Bitartrate of potash.	Supertartrate of lime.
	Bitartrate of potash.

Must undergoes the vinous fermentation, as before stated, when placed in a temperature of between 60° and 80° Fahr., this fermentation being the metamorphosis of sugar into alcohol and carbonic acid, and this process continues until all the sugar is completely decomposed. The elements of the ferment, however, take no part in the transformation, or rather do not enter into a chemical combination with the elements of the sugar, for which reason some difficulty has been experienced in accounting for its agency in exciting fermentation. It has been ascertained, however, that the substance which possesses the power of exciting or inducing fermentation, in a new solution of sugar, and which has received the name of *ferment*, is a yellowish or gray insoluble body, containing a large proportion of nitrogen, produced by the fermentation of the grape juice, in addition to the alcohol and carbonic acid already mentioned. The alcohol and carbonic acid are produced from the elements of the sugar and the nitrogenized substance above mentioned, from the azotized constituents of the grape juice—vegetable albumen. "The manner in which this vegetable albumen or gluten is converted into a ferment is by the oxygen of the water, or of that of the sugar, combining with the gluten, hydrogen being set free, and entering into new combinations, or new compounds, containing a large proportion of hydrogen and a small quantity of oxygen, together with the carbon of the sugar, must be formed." (LIEBIG.) The *œnanthic ether* and *œnanthic acid* are other products of the deoxydation of the substances dissolved in the fermenting liquids; and although œnanthic ether and other volatile substances are formed from the deoxydation or interchange of the elements of vegetable albumen and sugar, there are other causes which influence their production and peculiarities.. The wines grown in France, owing to the large quantity of tartaric and other acids which they contain, possess, in a marked degree, the peculiar taste and odor, or BOQUET; whereas the wines of warmer climates possess little or none, owing to the absence of those acids. In the wines from the *Rhine* the perfume is powerful; the grapes, ripening late, and containing the largest proportion of acids: showing conclusively that the characteristic perfumes, and the acids of wines, have a certain connection—the acids seeming to exercise a certain influence on the formation of the perfumes.

Wines are divided into the *Red* and *White* wines. Red wines are derived from the must of black grapes, fermented with their husks. White wines are derived from white grapes, or from the must of black grapes fermented apart from their husks. White wines which, from a deficient supply of tannin, might be disposed to become *stringy,* can be preserved by adding the foot-stalks of ripe grapes.

The white wines should be racked off as soon as cleared by the first frosts, and at the latest by the middle of February; in this manner the fermentation, which would take place on the return of spring, is prevented; otherwise the sweetness of the wine would be destroyed by the remaining portion of the sugar being decomposed.

The modes in which the fermentation of wines is conducted, and the relative proportion of the constituents of the must, regulate or form the other qualities of the red and white wines.

Water, *sugar*, and a *ferment* are the essential ingredients of the *must*, as a fermentable liquid. If the juice contains a large portion of sugar, and sufficient ferment to sustain the fermentation, the conversion of the saccharine matter into alcohol will proceed until checked by the production of a certain amount of the latter, and a *spirituous* or *generous* wine will be formed. If the ferment be deficient in quantity, while a large portion of sugar is contained in the juice, less alcohol will be formed, and a *sweet* wine will be generated. When both the sugar and ferment are in considerable amount, and in the proper relative proportions for mutual decomposition, a *dry* wine will be formed.

Grapes which contain a small amount of sugar, will produce what are called *light* wines, which, should acetous fermentation take place to excess, become sour. In case the bottling of the wine takes place before the fermentation is fully completed, the carbonic acid that is generated will impregnate the wine, and render it effervescing, and form the *sparkling* wines, (*Vin Mousseux.*)

The *astringent* wines owe their flavor to the tannic acid derived from the husks of the grape, and the *acidulous* wines to the presence of carbonic acid, or a large proportion of tartar.

Sparkling wines are manufactured from black grapes of the first quality, the juice being extracted as gently as possible, so as to prevent the coloring matter of the skin from entering into the wine. *Inferior* wines are formed from the after-pressings, on account of the tint acquired from the husks. Casks are then three-fourths filled with the colorless must, fermentation soon begins, and is allowed to continue under the control of M. Sebille Auger's elastic bung for from twelve to eighteen days, and then three-fourths of the casks are filled up with wine from the rest. The bung is then well secured.

The clear wine should be racked off in the month of January, and fined by isinglass dissolved in old wine of the same kind. From thirty-five to forty-five days after, a second fining takes place, and, if the lees are considerable, a third may be found necessary. The clear wine is drawn off in the month of May into bottles, adding to each a small measure of *liquor*, which is merely three per cent. of a sirup made by dissolving sugar candy in white wine. When the bottles are filled, and the corks secured by pack-thread and wire, they are laid on their sides, with their mouths sloping downward at an angle of twenty or twenty-five degrees, so that any sediment contained in them may fall into the neck. At the end of from six to twelve days the slope is increased, when they are slightly tapped, and placed in a vertical position; then, in the course of some days, the cork is partially removed, to allow the sediment to be forced out by the pressure of the gas. An additional quantity of *liquor* and fining should be added to each, in case the wine be still muddy, and the bottles again placed in the inverted position. In several months the process must be repeated if the wine be still deficient in transparency.

The wine prepared as above is generally fit for use at the end of about twenty or twenty-five months, depending on the seasons.

Weak wines ought to be consumed within sixteen months after being made, and meantime kept in cool cellars. Casks containing white wines should be kept constantly full, and carefully excluded from contact with the air, and racked, before the whole quantity of sugar has become decomposed, too much fermentation injuring them.

Strong wines may remain from twelve to eighteen months upon the lees, so as to promote their insensible fermentation, before being racked off; for which purpose a siphon should be preferred.

Wines, though consisting mainly of *water* and *alcohol*, contain besides, *blue coloring matter* of the husk in red wines, *yeast, acetic, tannic, malic, tartaric*, and *carbonic acids; sugar, extractive matter, gum, tartar, tartrate of lime, volatile oils*, and *œnanthic ether.* The characteristic odor and aroma possessed by all wines is, in a greater or less degree, produced by the essential oil.

The *œnanthic ether* is obtained toward the end of the operation of distillation, and is from about 1-15,000th to 1-40,000th part of the wine. It is an oily, colorless liquid, having a peculiar smell, almost intoxicating when inhaled, and is analogous to the fatty acids, the ether being liquid, but insoluble in water. Its specific gravity is 0·862, and boiling point 0·435.

The other ingredients mentioned are not all present in every wine. Sugar is present in sweet wine; carbonic acid in sparkling wines; tannic acid and tartar in rough wines. Malic acid, in small portions, is present in some wine, and absent in others. The alcohol contained in wines is intimately united with the other ingredients of the liquor, and constitutes the intoxicating principle; hence their strength depends on the quantity of alcohol which they contain. This has been the subject of careful investigation by a great number of chemists; but as the results must vary with different seasons, they can only be received as merely approximative.

An abstract of the results of three of the most distinguished chemists—M. Jules Fontenelle, Dr. Christison, and M. Brandt—is given in the following table, the proof-spirit taken at the standard of 0·825:—

Table of the Proportion, by measure, of Alcohol contained in 100 *parts of different Wines, sp. gr. of Alcohol* 0·825.

Lissa (mean average)	25·41
Raisin wine (mean)	25·12
Marsala, Sicily Madeira (mean)	25·09
Port (strongest)	25·83

Port (mean)	22·96
Port (weakest)	19·00
Port (strongest, C.)	20·49
Port (mean, C.)	18·68
Port (weakest, C.)	16·80
White Port (C.)	17·22
Sherry (strongest)	19·81
Sherry (mean)	19·17
Sherry (weakest)	18·25
Sherry (strongest, C.)	19·31
Sherry (mean, C.)	18·47
Sherry (weakest, C.)	16·96
Sherry, Amontillado, (C.)	15·18
Malmsey Madeira	16·40
Malmsey (C.)	15·60
Lunel	15·52
Lunel (J. F.)	18·10
Sheraaz	15·52
Madeira (strongest)	24·42
Madeira (mean)	22·27
Madeira (weakest)	19·24
Madeira (strongest, C.)	20·35

Sercial Madeira	21·40
Sercial Madeira (C.)	18·50
Rousillon (mean)	18·13
Claret (strongest)	17·11
Claret (mean)	15·10
Claret (weakest)	12·91
Claret (weakest, J. F.)	14·73
Claret (Vin-ordinaire, C.)	10·42
Claret, Chateau Latour, 1825, (C.)	9·38
Claret, first growth, 1811, (C.)	9·32
Teneriffe	19·79
Teneriffe (C.)	16·61
Colares	19·75
Syracuse	15·28
Sauterne	14·22
Burgundy (mean)	14·57
Hock (mean)	12·08
Lachryma Christa	19·70
Sheraaz (C.)	15·56
White Constantia	19·75
Red Constantia	18·92
Lisbon	18·94

Lisbon (C.)	19·09
Bucellas	18·49
Red Madeira (mean)	20·35
Cape Muschat	18·25
Cape Madeira (mean)	20·51
Grape wine	18·11
Calcavella (mean)	18·65
Vidonia	19·25
Alba Flora	17·26
Zante	17·05
Malaga	17·26
White Hermitage	17·43
Currant wine	20·55
Gooseberry wine	11·84
Orange wine	11·26
Elder wine	8·79
Brown stout	6·80
Nice	14·63
Barsac	13·86
Tent	13·30
Champagne (mean)	12·61
Champagne (J. F.)	12·20

Red Armitage	12·32
Vin de Grave (mean)	13·37
Frontinac (Rives Altes)	12·79
Frontinac (J. F.)	21·80
Frontinac (C.)	12·29
Côtie Rôtie	12·32
Tokay	9·88
Rudesheimer (C. first quality)	10·14
Rudesheimer (C. inferior)	8·35
Hambacher (C. first quality)	8·88
Cider (average)	7·51
Perry	7·26
Mead	7·32
Burton ale	8·88
Edinburgh ale	6·20
London porter	4·20

Though the intoxicating power of any liquid is generally in proportion to the quantity of alcohol it contains, wines are an exception; the other constituents of the wine having the power of modifying the strength of the alcohol, rendering it less intoxicating than the same quantity of alcohol, separated by distillation and diluted with water: for a brandied wine—that is, a wine to which brandy has been added—is much more intoxicating than wine equally strong in alcohol to which no brandy has been added. "Dealers" endeavor to remedy this by the operation of "*fretting in*," thereby effecting the chemical union of the foreign spirit with the constituents of the wine, by a renewed fermentation. Dr. Christison considers it a mistake to suppose that wines become stronger by being kept a long time in a cask, his experiments proving the reverse. The flavor of wine *is* improved by being kept a long time, and its body, or apparent strength, increased. Authorities, however, do not agree in regard to the latter.

As before remarked, *Teneriffe*, *Madeira*, *Sherry*, *Port*, and the *Claret* wines of France are most extensively imported, and therefore require a passing notice. *Claret*, (*vinum Rubellam*,) known in France as the *Vin de Bordeaux*, is a slightly acidulous, astringent wine, of a deep purple color, delicate taste, and is ranked as a light wine. The most esteemed Clarets are the produce of *Lafite*, *Latour*, *Château Margaux*, and *Haut-Brion*. It is made in large quantities around *Bordeaux*, from which port it is shipped. It contains, on an average, fifteen per cent. of alcohol. The Clarets are the least injurious of all wines.

Port is an astringent, rough, sweetish wine. When long kept it loses its astringency, sweetness, and coloring matter. It is one of the *strong* wines. Its color is of a deep purple, and it contains about twenty-three per cent. of alcohol.

Teneriffe is a wine of good quality, and fine aromatic flavor. It contains about 19·79 per cent. of alcohol. It is a *white* wine, slightly acidulous.

Madeira is more stimulating than Sherry, slightly acidulous, is esteemed the strongest of the white wines in general use, and is more adulterated than any of the other commercial wines. When in good condition, it has a fine aromatic flavor, containing 22·27 per cent. of alcohol.

Sherry is a *Spanish* wine, prepared near Xeres, in Spain; hence, in English, it is called Sherry. It is a *dry* wine, of a deep amber color, and, when pure, possesses a dry aromatic flavor, without any acidity. It is one of the strongest of the white wines.

Champagne is a *white* wine, brisk, frothing, sparkling, effervescing, and much used.

The reader must, by this time, have perceived the necessity of observing certain rules, without which the manufacture of wine becomes impossible:—

1st. The grapes should be plucked in dry weather, at the interval of a few days after they are ripe, and transported to the vats in dorsels sufficiently tight to prevent the juice from running out.

2d. Whenever a layer of fourteen or fifteen inches thick has been spread on the bottom of the vat, the treading operation begins, (unless the wine-press is used,) which is usually repeated after macerating the grapes for some time. When an incipient fermentation has softened the texture of the skin and the internal cells, the grapes should be well and equally bruised and trodden, for the first juice contains little mucoso-saccharine matter, and consequently does not ferment freely, that substance being chiefly contained in the insoluble organized parts, and the skin, which also contains the greatest part of the acid, resinous, extractive, and coloring matter.

3d. The temperature at which fermentation takes place must be conducted at about 60° to 75° Fahr., below which it languishes, and above which it proceeds too violently. When it proceeds too slowly, add a little *boiling must.*

4th. The contact of air is necessary in the commencement, affording another reason for the perfect bruising of the fruit, as much air is absorbed in that process. But after the fermentation is well begun, the air must be excluded; the French chemist, Chaptal, recommending the vats to be covered with boards and linen cloths, for the purpose of preserving the *aroma*, which would otherwise escape.

5th. The greater the bulk the more perfect the wine.

6th. When the wine is ready to be racked off, it ought to be subjected to the operation of *sulphuring*,—that is, exposed to sulphurous acid, either by burning sulphur matches in the cask, or by the addition of wine impregnated with the acid, to render the glutinous matter incapable of re-exciting fermentation.

After having obtained good wine, the preservation of it depends on its future management, every wine containing within itself the sources both of improvement and decline. Guard against sudden transition from cold to heat, or the reverse, as wines are very liable to become sour by being exposed to the vicissitudes of temperature and the contact of air. Neglect in properly *fining* likewise favors *acescency*. Fining too often repeated also impairs the flavor and body of the liquor.

On *racking* wines, if the burning sulphur be extinguished in plunging it into the cask, it is a proof that the cask is unsound, and unfit to receive the wine, in which case it should be well cleansed, first with lime-water, then with very dilute sulphuric acid, and lastly with boiling water.

Sometimes a violent fermentating movement takes place after the wine has been run into casks, and if tightly closed may burst the hoops or open the seams of the staves. This must be prevented by adding about 1-1,000th part of *sulphite of lime;* or, better still, to introduce half a pound of mustard-seed into each barrel, and as soon as the movements are allayed, the floating ferment, which has been the cause, should be removed by fining.

When a wine contains too little alcohol, or has been exposed too largely to the air, or to vibrations, or to too high a temperature in the cellar, it becomes *sour*. Mix it immediately with its bulk of stronger wine in a less advanced state, fine it, bottle it, and consume it, for it will never prove a good-keeping wine. This *distemper* in wines gave rise to the practice of adding litharge as a sweetener; the oxide of lead formed, with the acetic acid, accetate of lead, which, being sweet, corrected the sourness of the wine, but at the same time was productive of the most serious consequences to those who drank it. This gross abuse has been entirely abandoned.

Ropiness or *viscidity* renders wine unfit for drinking, and is owing, as was ascertained by M. Francois, to an azotized matter analogous to gliadine, (gluten;) the *white* wines, which contain the least tannin, being most subject to this malady. This can be prevented by pure tannic acid, or powdered nut-galls. The tannin may be added under a more agreeable form—namely, the bruised berries of the mountain ash, (Sorbier,) in a somewhat unripe state, of which one pound, well stirred in, is sufficient for a barrel. After agitation the wine is to remain quiet two days, then racked off. The *ropiness* will, by this time, be removed, and the wine is then to be fined and bottled.

When wine is put into casks that have remained long empty it sometimes tastes of the cask. This is best remedied by agitating the wine for some time with a spoonful of olive oil. An essential oil, the cause of the bad taste, combines with the fixed oil, and rises with it to the surface.

Wines, before being *bottled*, must, as before stated, go through the process of fining, and may be fined with isinglass, in the proportion of two ounces of the purest isinglass dissolved in two pints of water, and mixed with two quarts of the wine—this being sufficient for a hogshead.

Red wines are fined by beating the white of eggs into a froth, and mixing them with three times their bulk of water, then adding two gallons of the wine, in the proportion of twenty-eight eggs to the hogshead. Bullock's blood, which was at one time much in vogue, is now seldom used. Other articles are frequently used, but possess no advantages over the eggs and isinglass, which answer every indication, and are easily obtained.

In *bottling*, care should be taken that the bottles have been properly cleansed, being *clear* and *dry* and free from *odor*. Prepare the *corks* by placing them in a bucket, and covering them with a solution made by dissolving two ounces of bicarbonate of soda in one gallon of boiling water, then standing twelve hours. Then place them in a bucket of boiling water containing half a pound of loaf sugar. After standing another twelve hours, soak them in clear cold water, and they are fit for use. After bottling put the bottled wine in the place where it is to remain, which should be, as before stated, a *cool, dry wine-cellar,* paved or graveled, with openings toward the north, and of such depth as to insure the proper temperature, which can only be ascertained and regulated by having one or more thermometers suspended on the walls.

The fining of the wine can be done to the greatest perfection by bottling or racking off during the *clearest* and *coldest* weather in winter, at which time it will, of course, deposit most of its soluble matter. "This was an important secret kept and practiced with much success by a celebrated Philadelphia wine-merchant."

Coloring matters are very generally employed to deepen or change the tint of wine. In Spain *boiled must,* of the consistency of molasses, and having a similar flavor, but with a strong empyreumatic taste, is employed to deepen the color of Sherry. *Caramel* or burnt sugar is used for the same purpose, and may be used to color from a light amber to a dark brown. In Portugal the juice of the *elder-*

berry has been employed to augment the color of Port wine. The extracts of *logwood* and *rhatany* are used for the same purpose. For other coloring material the reader is referred to the different formulæ, and to the "Appendix."

Flavoring substances are also frequently added to wines. For instance, in Spain a dry kind of Sherry, called *Montellado,* is added to Sherries that are deficient in the *nutty* flavor; and, being very light in color, it is also used to reduce the color of Sherries that are too high. In this country American wines are flavored and colored so as to make them resemble imported wines. The alcoholic solution of the essential oil of *bitter almonds* is, perhaps, more used than any other flavoring material for the purpose of giving a nutty flavor to many weak-flavored wines.

Tincture of *kino, rhatany,* and *oak bark,* or a solution of their extracts, is used when astringents are required, and a large number of articles possessing the proper fragrance, for the purpose of imparting the peculiar *aroma* or BOQUET of the French wines.

We have now given a sketch of the constituents, production, division, varieties, proportion, and management of foreign wines; and we can only express our regret, when we are compelled to acknowledge that a pure foreign wine is seldom—we had almost said never—seen in this country, the large proportion of wines being diluted and adulterated before leaving foreign ports. Our object in the next article, "On the Imitation of Foreign Wines," will be to show you the methods made use of, and instruct you in all the arts and mysteries of that "secret of the trade" which has, and will continue to enrich, all those who are so fortunate as to acquire, and practice upon, the information spread out upon these pages. Be careful to use the different ingredients precisely as laid down in the formulæ, the smallest excess oftentimes injuring the whole.

IMITATION OF FOREIGN WINES

CIDER.—CIDRE, *Fr.;* ZIDER, *Ger.;* CIDRO, *Ital.* Cider is a vinous beverage, made by fermenting the juice of apples; and as it is the most important substance required for the proper *imitation of foreign wines,* it is necessary to become acquainted with its properties, the best method of manufacturing it, and with the peculiar mode of preparing it for the purpose here spoken of.

The juice of the apple consists of *water, malic acid,* and *sugar.* As in the fermentation of the grape juice, the sugar, or saccharine principle, is partly changed to alcohol. When this principle is in small quantity, its deficiency must be made up, or we have a liquor without body, watery and weak, which renders it difficult to preserve. Should the saccharine element not have been added before fermentation had taken place, it can still be remedied by adding alcohol after the liquor is formed; or, more properly speaking, after fermentation. The most saccharine apples furnish about thirty ounces of sugar to a gallon of juice. Good cider apples should be both saccharine and astringent. The best fruit should always be selected for making cider. The fruit should be gathered by the hand, when thoroughly ripe; or, if shaken, the ground should be covered with mats, to prevent them from being bruised, thereby causing rottenness before the grinding process commences, care being taken to keep each kind separate, so that only those ripening at the same time be ground together.

Apples not perfectly ripe should be placed in large heaps and covered, thus to sweat, and then bring them in ripe at the proper time for making cider. *Rotten* apples must be excluded.

Care must be taken in grinding to reduce the whole fruit—skin and seed—to a fine, uniform pulp, consequently the best machinery only should be used. The *pumice* should then remain from two to eight days, (depending upon the weather,) agitating the mass daily till put to the press. This proceeding has a tendency to cause the saccharine principle to be developed; to cause the pumice, which at first was sourish, to become sweet, sugar being produced by the union of pulp and juice, which, if sooner separated, could not have been formed in such quantity. Joseph Cooper, of New Jersey, one of the best authorities, says "the longer a cheese lies after being ground, before pressing, the better for the cider, provided it escapes fermentation until the pressing is completed."

After the pressing, strain the juice through a fine sieve, and allow it to ferment for three or four days, taking off the scum as it rises; then rack into casks that are *strong*, *tight*, and *sweet*, and place it in a *cool* situation, so that fermentation may progress *slowly*, the alcohol escaping with carbonic acid should the fermentation go on too rapidly. Various methods are in use to prevent too rapid fermentation. One pound of black oxide of manganese, powdered, restrains fermentation. A handful of powdered clay to a barrel answers the same purpose. Sulphuring the barrel has also the same effect.

After racking, confine the liquor by driving the bung close, and by sealing. A vent must be left, and the spile carefully drawn at times, but only when necessary, to prevent the casks from bursting. When the sediment has subsided, rack in *clean, sweet casks,* and add to every barrel of forty gallons two and a half gallons of spirit 15 O. P.,

2 pints simple sirup.
10 ounces crude tartar.
2 pounds of raisins.
2 ounces orange-flower water.

Then agitate the casks (they being well filled and not closed) for a few minutes. The second fermentation soon begins, the scum to be removed if necessary, and the liquor occasionally agitated. At the expiration of eight days to a fortnight it must again be racked off, filled, and the liquor closely confined by driving the bung tight, and sealing. In from three to five weeks fill up the casks, and in a fortnight further examine it. If fine and clear, rack it once more, taking especial care that you select a *fine, clear, tight, sweet* barrel; but should it not be clear, it must then undergo the process of *fining,* and be afterwards racked in the manner above mentioned. This cider is entirely distinct from the other sweet cider, and is prepared in this manner to serve as the "basis" for the *imitation of foreign wines.* This prepared cider will keep for years if placed in a low temperature.

We will again repeat the following general rules agreed upon by the best authorities for the making of cider:—

1st. Gather the fruit when fully ripe—picking with the hand is to be preferred; if shaken, protect them from bruising by thick mats, or other suitable material.

2d. In grinding, reduce the whole fruit—skin and seeds—to a uniform pulp.

3d. Allow the pumice, or bruised mass, to remain from two to eight days, according to the state of the weather,—if warm for a shorter period, if cold for a longer period,—agitating the mass every day until put to the press.

4th. If there is a deficiency of the saccharine principle, add sugar before fermentation, or alcohol after fermentation.

5th. Let the liquor remain a few days after being strained through a sieve, taking off the scum as it rises, then racked in casks, and placed in a cool cellar; or let it be a few hours after the pressing, placed in a cool cellar in strong, tight, sweet casks, and, after the pulp has all overflown, drive the bung close, and seal, leaving a vent, the spile only to be drawn when necessary to prevent bursting.

6th. To finish the process for making the prepared cider, by carefully observing the instructions to the very letter, on the principle that "what is worth doing is worth doing well."

7th. Do not neglect to place and keep the "prepared cider" (as well as all other ciders) in a cool temperature, so as to prevent it from taking on the *acetous* fermentation, which it is apt to do when the temperature is too high.

8th. Sweet apples are always to be preferred for making the "prepared cider," which is to be used for imitating foreign wines; the object being to have the saccharine principle in quantity and quality, thereby securing, at a low temperature, a strong vinous liquor.

Our object, thus far, has been to give the reader a proper insight into the practice and principles which govern the manufacture and fermentation of vinous liquors, and of instructing him in preparing the basis for the imitation of foreign wines, or, in other words, of initiating them in the "art and mysteries" of making precisely the same article of wines which they have for years been purchasing, the only difference, if any, being that the wines made according to the formulæ hereafter given are generally superior to those commonly obtained. The wines made in accordance with the rules laid down in this work are made on scientific principles, the same ingredients being added and supplied which really exist in "pure foreign wines," and therefore are superior to the *drugged* imitations that are generally sold to the trade.

We will now proceed to instruct the reader how to manufacture the different varieties of wines, premising that he will, in preparing the wines, fulfill our instructions to the very letter; care and attention being all that are required to insure success.

No. 1.—PORT.

To 20 gallons prepared cider add:—

5	gallons good Port wine.
3	pounds bruised raisins.
4	quarts cluster grapes.
3	ounces tincture rhatany.
1	ounce tincture kino.
1½	pints simple sirup.
2	gallons pure proof-spirits.

Color, if too light, with rhatany; let it stand two weeks, rack it and fine it, and repeat the racking and fining process, if necessary, until the wine is perfectly clear and transparent; keep in a cool place.

No. 2.—PORT.

To 20 gallons prepared cider add:—

4	gallons Port wine.
1	gallon good brandy.
2	pints simple sirup.

2 pounds bruised raisins.
2 ounces tincture kino.
1 ounce extract rhatany.
1½ gallons pure proof-spirits.

Let them stand ten days, and proceed as in No. 1.

No. 3.—PORT.

To 20 gallons prepared cider add:—
3 gallons good Port.
2 pounds bruised raisins.
1 ounce tincture kino.
1½ pints simple sirup.
2 gallons proof-spirits.
½ gallon good brandy.

Let them stand eight days, and proceed as in No. 1.

No. 4.—PORT.

To 15 gallons prepared cider add:—
3 gallons best Port wine.
2 gallons red native wine.

1 gallon proof-spirits.
3 ounces tincture kino.
2 ounces tincture rhatany.
3 pounds loaf sugar.
2 quarts wild grapes.

Let them stand ten days, and proceed as in No. 1.

No. 5.—MADEIRA.

To 20 gallons prepared cider add:—
5 gallons Madeira wine.
1½ gallons pure proof-spirits.
2 ounces tartaric acid.
½ drachm essential oil of bitteralmonds, cut in ½ pint alcohol 94 per cent.
1 gallon good brandy.
2 pounds raisins.

Let them stand ten days, and proceed as in No. 1.

No. 6.—MADEIRA.

To 20 gallons prepared cider add:—
3 gallons Madeira wine.

1 gallon proof-spirits.
2 ounces tartaric acid.
½ drachm essential oil of bitter almonds, cut in ½ pint alcohol.
1 gallon brandy.
4 pounds raisins.

Let them stand ten days, and proceed as in No. 1.

No. 7.—MADEIRA.

To 20 gallons prepared cider add:—
2 gallons Madeira wine.
1½ gallons pure proof-spirits.
½ gallon brandy.
1½ ounces tartaric acid.
½ drachm oil of bitter almonds, cut it 1 pint alcohol.
3 pounds loaf sugar.

Let them stand five days, and proceed as in No. 1.

No. 8.—MADEIRA.

To 15 gallons prepared cider add:—

5 gallons native wine.
1 gallon good brandy.
1 gallon proof-spirits.
½ drachm oil of bitter almonds, cut in 1 pint alcohol.
1 ounce cream of tartar.
2 pounds loaf sugar.
3 pounds bruised raisins.

Let them stand ten days, and proceed as in No. 1.

No. 9.—SHERRY.

To 20 gallons prepared cider add:—

5 gallons Sherry wine.
1 gallon pure proof-spirits.
½ drachm essential oil of bitter almonds, cut in 1 pint alcohol.
1 pint simple sirup.
3 pounds bruised raisins.

1 quart good brandy.
3 ounces tincture saffron.

Let them stand ten days, rack and fine as in No. 1.

No. 10.—SHERRY.

To 16 gallons prepared cider add:—
3 gallons Sherry.
2 gallons native wine.
½ drachm oil of bitter almonds, cut in alcohol.
1½ gallons proof-spirits.
2 pounds loaf sugar.
2 ounces tincture saffron.

Manage as No 9.

No. 11.—SHERRY.

To 15 gallons prepared cider add:—
5 gallons Teneriffe wine.
½ drachm oil of bitter almonds, cut in alcohol.
1 gallon proof-spirits.

2 quarts good brandy.
2 ounces tincture saffron.

Manage as No. 9.

No. 12.—SHERRY.

To 15 gallons prepared cider add:—

2 gallons Sherry.
2 gallons Teneriffe.
1 gallon proof-spirits.
1 pound loaf sugar.
½ drachm oil of bitter almonds, cut in alcohol.
2 pounds bruised raisins.
2 ounces tincture saffron.

Manage as No. 1.

No. 13.—TENERIFFE.

To 20 gallons prepared cider add:—

5 gallons Teneriffe.
1½ gallons pure proof-spirits.
4 drachms citric acid.
1 pint sirup.

Let them stand six days, and manage as in No. 1.

No. 14.—TENERIFFE.

To 20 gallons prepared cider add:—

4 gallons Teneriffe.
2 gallons pure proof-spirits.
3 drachms citric acid.
3 pounds raisins.
2 pounds loaf sugar.

Let them stand ten days, and manage as in No. 1.

No. 15.—TENERIFFE.

To 20 gallons prepared cider add:—

3 gallons Teneriffe.
3 drachms citric acid.
2 pounds raisins.
1 pint simple sirup.
2 gallons pure proof-spirits.

Let them stand ten days, and manage as in No. 1.

No. 16.—TENERIFFE.

To 15 gallons prepared cider add:—

5 gallons native white wine.

3 drachms citric acid.

1 pint honey.

½ drachm oil of bitter almonds, cut in alcohol.

1½ gallons pure proof-spirits.

Let them stand ten days, and manage as in No. 1.

No. 17.—CLARET.

To 20 gallons prepared cider add:—

3 gallons Claret.

½ pound cream of tartar.

½ pint honey.

2 drachms citric acid.

2 pounds raisins.

2 ounces tincture red sanders.

1 gallon water.

Let them stand ten days, rack and fine as in No. 1.

No. 18.—CLARET.

To 20 gallons prepared cider add:—

4 gallons good Port wine.
1 gallon water.
1 pound tartar.
1 pint sirup.
1½ drachms citric acid.
2 pounds raisins.

Color, if required, with red sanders, or red beet-juice; let them stand ten days, rack and fine as in No. 1.

No. 19.—CLARET.

To 15 gallons prepared cider add:—

2 gallons Port wine.
½ pound cream of tartar.
1 drachm citric acid.
2 pounds loaf sugar.
1 gallon water.

Color as before, and manage as in No. 1.

No. 20.—CLARET.

To 15 gallons prepared cider add:—
5 gallons red native wine.
¼ pound cream of tartar.
1½ gallons water.
½ pint honey.
10 lemons, (juice of.)
2 pounds bruised raisins.

Color as before, and proceed as in No. 1.

No. 21.—MALAGA.

To 20 gallons prepared cider add:—
4 gallons good Malaga wine.
2 ounces cream of tartar.
4 pounds bruised raisins.
2 pints simple sirup.
1 ounce tincture kino.
1 quart best brandy.

Color with caramel, or burnt sugar, and manage as in No. 1—standing ten days.

No. 22.—MALAGA.

To 20 gallons prepared cider add:—

3 gallons good Malaga wine.
1½ ounces tincture kino.
1 ounce cream of tartar.
2 pounds New Orleans sugar.
½ ounce tincture of rhatany.

Color as before, and manage as in No. 1, after standing six days.

No. 23.—MALAGA.

To 20 gallons prepared cider add:—

3 gallons good Malaga wine.
3 gallons native red wine.
2 ounces tartar.
1 ounce tincture kino.
1 ounce tincture rhatany.
1 pint honey.

Color as before, after standing six days; then manage them the same way as laid down in No. 1.

No. 24.—MALAGA.

To 15 gallons prepared cider add:—

5 gallons red native wine.
2 ounces tincture kino.
4 pounds New Orleans sugar.
4 pounds bruised raisins.

Color, and let them stand for ten days; then manage according to the directions mentioned in No. 1.

No. 25.—LISBON.

To 20 gallons prepared cider add:—

5 gallons good Lisbon wine.
5 pounds grapes, in clusters.
1 ounce tincture rhatany.
1 ounce tincture kino.
3 pounds loaf sugar.
2 gallons proof-spirits.

Color, if it is necessary, after they have stood for ten days. Then manage the same as in No. 1.

No. 26.—LISBON.

To 20 gallons prepared cider add:—
4 gallons Lisbon wine.
4 pounds raisins.
2 ounces tincture rhatany.
1 pint sirup.
1½ gallons spirits.
1 quart brandy.
1 ounce tartar.

Color, and manage as in No. 1, after standing ten days.

No. 27.—LISBON.

To 20 gallons prepared cider add:—
3 gallons Lisbon wine.
2 gallons red native wine.
1 pint honey.
4 pounds bruised raisins.
1 ounce tincture kino.
1½ gallons proof-spirits.

Color; let them stand eight days, and proceed as in No. 1.

No. 28.—LISBON.

To 15 gallons prepared cider add:—
5 gallons native red wine.
1 pint simple sirup.
2 ounces tincture kino.
1½ gallons proof-spirits.
½ gallon good brandy.

Color; let it stand ten days, and manage as in No. 1.

No. 29.—CHAMPAGNE.

To 20 gallons prepared cider add:—
2 pints simple sirup.
1½ ounces tartaric acid.
2 ounces yeast.
2 gallons water.
2 gallons spirits, 10 under proof.

Proceed as in note to formula No. 32.

No. 30.—CHAMPAGNE.

To 20 gallons prepared cider add:—
4 drachms citric acid.

1 pint simple sirup.
1 gallon water.
2 gallons spirits, 10 under proof.
1 ounce tartaric acid.

Manage according to note to formula No. 32.

No. 31.—CHAMPAGNE.

To 20 gallons prepared cider add:—

2 gallons water.
1 gallon proof-spirits.
10 ounces yeast.
1 pint honey.
4 drachms citric acid.

Manage as in note to formula No. 32.

No. 32.—CHAMPAGNE.

To 15 gallons prepared cider add:—

5 gallons native white wine.
2 pints simple sirup.
2 drachms citric acid.
1 ounce tartaric acid.
1 gallon spirits, 10 under proof.

Let the Champagne stand twelve days in a cool cellar, then fine and bottle it if *brisk, frothing,* and *sparkling;* if not, add more *acid,* and *fine* it again, repeating the process, if necessary, until suitable for bottling. Add, when bottling, to each about two thimblefuls of a sirup made by dissolving half a pound of rock candy in one pint of white wine; then cork, wire, and place in position and temperature according to previous instructions.

DOMESTIC WINES.

No. 33.—BLACKBERRY WINE.

To 20 gallons pure proof-spirits add:—
10 gallons water.
12 pounds sugar.
25 quarts blackberries.
½ pint orange-flower water.
2½ ounces tincture kino.
1 ounce tartaric acid.
½ pint yeast.

Mix thoroughly, and stand in a medium warm temperature until fermentation takes place; then rack it off and fine it, ready for use. Keep in a cool place.

No. 34.—BLACKBERRY WINE.

To 20 gallons pure proof-spirits add:—
6 gallons water.

10 pounds loaf sugar.
2 pine-apples, sliced.
20 quarts blackberries.
2 ounces tincture catechu.
2 ounces tartaric acid.
1 pint yeast.

Mix thoroughly, and proceed as in No 33.

No. 35.—RASPBERRY WINE.

To 20 gallons pure proof-spirits add:—
8 gallons water.
12 pounds loaf sugar.
½ pint orange-flower water.
1 pint yeast.
1½ ounces tincture kino.
25 quarts raspberries.
1 ounce tartaric acid.

Mix thoroughly, and proceed as in formula No. 33.

No. 36.—RASPBERRY WINE.

To 20 gallons pure proof-spirits add:—
6 gallons water.

10 pounds loaf sugar.
1 pine-apple, sliced.
½ pint yeast.
1½ ounces tartaric acid.
2 ounces tincture kino.

Mix thoroughly, and proceed as in formula No. 33.

No. 37.—CURRANT WINE.

To 20 gallons pure proof-spirits add:—
6 gallons water.
10 pounds loaf sugar.
20 quarts currants, (the juice.)
½ pint orange-flower water.
1½ gallons good Port wine.

Let it stand ten days, and draw it off ready for use.

No. 38.—CURRANT WINE.

To 20 gallons pure proof-spirits add:—
8 gallons water.
12 pounds loaf sugar.

16 quarts currants, (the juice.)
2 gallons Madeira wine.

Let it stand eight days, and draw it off ready for use.

No. 39.—CURRANT WINE.

To 40 pounds of currants (the juice) add:—
20 gallons water.
30 pounds loaf sugar.
¾ pound cream of tartar.
5 gallons brandy.
½ pint orange-flower water.

Color; fine and decant when necessary.

No. 40.—STRAWBERRY WINE.

To 40 pounds ripe strawberries add:—
16 gallons soft water.
30 pounds loaf sugar.
¾ pound cream of tartar, dissolved in hot water.
3½ gallons good brandy.
2 quarts Madeira wine.

Let it stand ten days, then draw it off for use.

No. 41.—STRAWBERRY WINE.

To 20 gallons pure spirits add:—
8 gallons water.
20 quarts strawberries, (the juice.)
10 pounds loaf sugar.
2 gallons good Sherry wine.
1 ounce tartaric acid.

Let it stand one week, and draw it off ready for use.

No. 42.—STRAWBERRY WINE.

To 10 gallons pure spirits add:—
10 gallons water.
20 quarts strawberries, (the juice.)
15 pounds loaf sugar.
2 gallons good brandy.
2 ounces cream of tartar.

Let it stand one week, and draw it off.

No. 43.—ELDER WINE.

To 20 gallons pure spirits add:—

8 gallons water.
20 quarts elder-berries, (the juice.)
20 pounds loaf sugar.
2 gallons good brandy.
2 ounces tincture kino.

Let it stand one week, and draw it off ready for use.

No. 44.—ELDER WINE.

To 10 gallons pure spirits add:—

10 gallons water.
20 quarts elder-berries, (the juice.)
15 pounds loaf sugar.
2 gallons Port wine.
½ pint orange-flower water.

Let it stand one week, then draw off.

No. 45.—ELDER WINE.

To 40 pounds elder-berries add:—

12 gallons water.

30 pounds loaf sugar.
¼ pound cream of tartar.
3 gallons good brandy.

Let it stand one week, and draw off.

No. 46.—MORELLO-CHERRY WINE.

To 20 gallons pure proof-spirit add:—
10 gallons water.
30 pounds loaf sugar.
20 quarts Morello cherries, (the juice.)
2 gallons good Port wine.

Let it stand one week, and then draw off.

No. 47.—MORELLO-CHERRY WINE.

To 10 gallons pure spirits add:—
10 gallons water.
25 pounds loaf sugar.
20 quarts Morello cherries, (the juice.)
2 gallons good brandy.
1 ounce tartaric acid.
½ pint orange-flower water.

Let it stand one week, and draw off.

No. 48.—MORELLO-CHERRY WINE.

To 40 pounds Morello cherries add:—
12 gallons water.
30 pounds loaf sugar.
¾ pound cream of tartar.
3 gallons brandy.

Let it stand one week, and draw off.

Gooseberry, *Whortleberry*, *Apple*, *Mulberry*, *Apricot*, *Grape*, and *Damson* wine may be made after the formulæ last given, by substituting any of the above fruits in place of those mentioned in the formulæ.

The advantage in making domestic wines after the manner recommended is having a wine ready for use in a week; whereas, according to the general formula next given, a long time is required before the wine is fit to use. The reader may make his own choice.

GENERAL FORMULA

FOR

Currant, Cherry, Elder, Strawberry, Raspberry, Mulberry, Blackberry, Grape, Whortleberry,

OR OTHER FRUIT.

The berries must be ripe. Measure them, and to every quart of fruit allow a quart of clear soft water. Boil the water. Put the fruit into a clean tub, and mash it with a wooden masher. When the water has boiled, pour it on the fruit, and let it stand till next morning in a cool place, agitating the mass occasionally. Then press out all of the juice; measure it, and to every quart of liquid allow half a pound of sugar. Put the sugar into a cask, and strain the liquid upon it through a linen bag. Agitate the liquor until the sugar is dissolved. Let the cask remain open until the liquor has done working. Then add half an ounce of isinglass, or an ounce of gum-arabic dissolved in a pint of hot water; or, instead, use the whites of four eggs. Keep open till the next day. Then bung it, and, in two or three months, bottle it, and follow the instructions under the head of wines.

with a ferment it undergoes the vinous fermentation, which has already been explained. Its addition to liquors renders them less fiery, softer and richer.

Volatile oil is an oil obtained from the distillation of brandy from wine. It is of such strength that a few drops will impart its odor to a pipe of pure spirits. It is known among dealers as "Oil of Cognac."

Acetic acid is the acidifying principle of common vinegar. It is distinguished from all the other acids by its flavor, odor, and volatility. It is generated during the destructive distillation of vegetable matter, and is an abundant product of the acetous fermentation.

Acetic ether is a colorless liquid, of an agreeable but burning taste, and a very fragrant odor. It is soluble in seven or eight times its weight of water at 60°, and in all proportions in alcohol. It may be formed by distilling strong acetic acid with an equal weight of alcohol.

Œnanthic acid is an oily liquid, procured in the distillation of wine, as well as by submitting wine lees to distillation. The acid, as before remarked, is analogous to the fatty acids, is perfectly white when pure, and dissolves in alcohol and ether.

Œnanthic ether is colorless, has an extremely strong smell of wine, and a powerful, disagreeable taste.

Tannic acid, when pure, is colorless and inodorous, and has a purely astringent taste without any bitterness. It is soluble in ether, alcohol, and water. It exists in a large number of vegetables, including the grape husks, and is thus obtained as one of the constituents of brandy, having become incorporated by fermentation with wines.

The reader will, by this time, perceive the necessity of being acquainted with the constituents of pure French brandy, and will readily understand that, as proof-spirit (which is composed, as before stated, of half water and half absolute alcohol,) is of about the same strength as pure foreign brandy, and, if tasteless and inodorous, is precisely the same spirit as pure foreign brandy would be were it deprived of the oils, acids, and other constituents before mentioned, it plainly follows that, by taking a certain quantity of pure spirits—whether a few degrees above or below proof—and adding to that spirits the proper proportion of the volatile oil, acetic acid, acetic ether, œnanthic acid, and tannic acid, with the coloring matter found in every pure foreign brandy, you at once produce the article in all its purity, rendering it almost impossible for the most experienced dealer or the most skillful chemist to detect the imitation. The reason is, you have manufactured an article possessing all the *constituents* and *properties*, with the *fragrance* and *aroma* of the BEST FRENCH BRANDIES, and far superior to the diluted and adulterated brandies now brought from European ports.

You have now been made acquainted with the basis for making pure French brandy, which is any pure proof-spirit, whether distilled from corn or rye; as likewise with the constituents to be combined with the proof spirit for that purpose. All that remains is to acquaint you with the quantities or proportions of the different ingredients, so as to insure success; skill, care, and attention being all that is required, and a faithful observance of the rules and formulæ here given. Your own judgment must be your guide in regard to fragrance, flavor, color, etc. A specimen of the liquor to be imitated will always prove valuable in directing your judgment. The different proportions may be varied in some instances. Thus, if you wish a very high flavor, add more of the oil of Cognac; if more odor, use more œnanthic acid; if too fiery, add more sirup or sugar. But the reader will find that, as a general thing, the formulæ here given cannot be improved on, as experience has demonstrated their proportions to be the true ones for producing the *best imitations* of pure foreign brandies that have ever been made in this country.

No. 1.—COGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
5 gallons pure Cognac brandy.
1¼ ounces oil of Cognac.
¾ ounce œnanthic acid.
¾ ounce acetic ether.
1½ ounce tincture kino.
1 pint simple sirup.

Color with caramel, or burnt sugar, to the desired tint or shade. It may be used immediately, although, after thoroughly agitating, it is better to let it stand a fortnight.

No. 2.—COGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
4 gallons pure Cognac brandy.
1 ounce oil of Cognac.
1 ounce œnanthic acid.
½ ounce acetic acid.
½ ounce acetic ether.
1 ounce tincture kino.
1 pint simple sirup.

Mix thoroughly, color, and manage as in No. 1.

No. 3.—COGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
3 gallons pure Cognac brandy.
1½ ounces oil of Cognac.
1 ounce œnanthic acid.
¾ ounce acetic ether.
½ ounce acetic acid.
2 ounces tincture kino.
1½ pounds loaf sugar.

Color, and manage as in No. 1.

No. 4.—COGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
2 gallons pure Cognac brandy.
1½ ounces oil of Cognac.
1¼ ounces œnanthic acid.
1½ ounces acetic ether.
2 ounces tincture kino.
1½ pints simple sirup.

Color, mix, and manage as in No. 1.

No. 5.—ROCHELLE BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
5 gallons pure Rochelle brandy.
1½ ounces oil of Cognac.
1¼ ounces œnanthic acid.
1 ounce acetic ether.
½ ounce acetic acid.
4 ounces tincture kino.
1½ pints simple sirup.

Color, mix, and proceed as in No. 1.

No. 6.—ROCHELLE BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
4 gallons pure Rochelle brandy.
1¼ ounces oil of Cognac.
2 ounces acetic ether.
1 pint simple sirup.
2½ ounces tincture kino.
1 ounce œnanthic acid.

Mix, color, and proceed as laid down in No. 1.

No. 7.—ROCHELLE BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
3 gallons pure Rochelle brandy.
1 ounce oil of Cognac.
2½ ounces acetic ether.
3 ounces tincture kino.
1½ pints simple sirup.
¾ ounce œnanthic acid.

Mix, color, and proceed according to formula No. 1.

No. 8.—ROCHELLE BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
2 gallons pure Rochelle brandy.
1¾ ounces oil of Cognac.
1½ ounces œnanthic acid.
3 ounces acetic ether.
3 ounces tincture kino.
4 pounds loaf sugar.

Mix, color, and proceed according to formula No. 1.

No. 9.—BORDEAUX BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
5 gallons pure Bordeaux brandy.
1½ ounces oil of Cognac.
1½ ounces œnanthic acid.
3½ ounces acetic ether.
2 ounces tincture kino.
2 pints simple sirup.

Mix, color, and proceed according to formula No. 1.

No. 10.—BORDEAUX BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—
4 gallons pure Bordeaux brandy.
1½ ounces oil of Cognac.
1 ounce œnanthic acid.
1 ounce acetic acid.
2 ounces acetic ether.
3 ounces tincture kino.
1½ pints simple sirup.

Mix, color, and proceed according to formula No. 1.

No. 11.—ARMAGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—

5 gallons pure Armagnac brandy.
1 ounce oil of Cognac.
1 ounce œnanthic acid.
1 ounce acetic ether.
2 ounces tincture kino.
3 pounds loaf sugar.

Mix, color, and proceed as in No. 1.

No. 12.—ARMAGNAC BRANDY.

To 20 gallons pure spirits (10 o. p.) add:—

4 gallons Armagnac brandy.
¾ ounce oil of Cognac.
1½ ounces œnanthic acid.
2 ounces acetic ether.
1 pint simple sirup.
1½ ounces tincture kino.

Color, mix, and proceed as in No. 1.

REDUCED BRANDIES.

No. 13.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons pure Cognac brandy.
1 ounce tincture kino.
2 pints simple sirup.

Color with sugar coloring. It may be used immediately, but is better if allowed to stand ten days.

No. 14.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

3 gallons pure Cognac brandy.
1 ounce acetic ether.
2 pints simple sirup.
2 ounces tincture kino.

Color, and manage as No. 13.

No. 15.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

- 2 gallons pure Cognac brandy.
- 2 ounces tartaric acid.
- 4 pounds bruised raisins.
- 1 ounce acetic ether.
- 2 ounces tincture kino.

Color as before. Let it stand ten days, and then draw off.

No. 16.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

- 1 gallon pure Cognac brandy.
- 5 pounds bruised raisins.
- 1 ounce acetic acid.
- 4 pounds loaf sugar.
- 2 ounces tincture catechu.

Color and manage as in No. 15.

No. 17.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons Rochelle brandy.
3 pounds loaf sugar.

Color, and allow it to stand ten days, though it may be used sooner.

No. 18.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—

3 gallons pure Rochelle brandy.
1 ounce acetic ether.
1 pint sirup.
3 ounces tincture kino.

Color as before, and proceed as in No. 17.

No. 19.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—

2 gallons Rochelle brandy.
4 pounds raisins.
4 ounces tincture kino.
1 pint sirup.
1 ounce acetic ether.

Color, and manage as laid down in formula No. 17.

No. 20.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—
1 gallon pure Rochelle brandy.
1½ ounces acetic ether.
1 ounce acetic acid.
4 ounces tincture kino.
1½ pints simple sirup.

Color, and proceed as in No. 17.

CHEAPEST BRANDIES.

No. 21.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

2 ounces acetic ether.
2 ounces acetic acid.
2½ ounces tincture kino.
5 pounds bruised raisins.
2 pints simple sirup.

Color with sugar coloring; let it stand twelve days, and draw it off.

No. 22.—COGNAC BRANDY.

To 20 gallons pure proof-spirits add:—

2 ounces tartaric acid.
6 pounds bruised raisins.
3 ounces tincture kino.
1 ounce acetic ether.
1 ounce acetic acid.
5 pounds loaf sugar.

Color with burnt sugar as before; let it stand twelve days, and draw it off.

No. 23.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—

3 ounces tincture catechu.
1 ounce tincture kino.
4 pounds loaf sugar.
2½ ounces powdered orris-root.
8 ounces crude tartar.
3 ounces acetic ether.

Color, and manage as No. 21.

No. 24.—ROCHELLE BRANDY.

To 20 gallons pure proof-spirits add:—

6 pounds bruised raisins.
2 ounces acetic ether.
1 ounce acetic acid.
2 ounces cassia-buds, ground.
2 pints simple sirup.
2 ounces tincture kino.
2 ounces tincture catechu.

Color, and manage as No. 21.

FANCY BRANDIES.

FANCY BRANDIES are liquors made by uniting with pure spirits (which exist in all brandies) some aromatic, acidulous, or other ingredient, combined with a certain proportion of sugar or sirup, the peculiar taste or fragrance of which is imparted to the liquor; from which circumstance the different fancy brandies derive their names. Fancy brandies are much sought after, and the sales of some houses are very large.

The formulæ for the manufacture of these brandies are far superior to any that have ever before been published.

A large majority of retailers, and of those who use these brandies as a beverage, prefer them well sweetened. The maker can, at his own pleasure, add a large or small quantity of sugar or simple sirup. The other ingredients should be added according to the directions hereafter given, and care taken that the whole be thoroughly incorporated, so as to insure a *fine, clear, transparent brandy.*

No. 25.—BLACKBERRY BRANDY.

To 20 gallons pure spirits add:—
24 quarts blackberries.
8 gallons water.
12 pounds loaf sugar.
½ ounce unground cloves.
1 ounce unground cinnamon.

Let it stand twenty days, draw off, strain and fine if necessary.

No. 26.—BLACKBERRY BRANDY.

To 20 gallons pure spirits add:—
16 quarts blackberries.
5 gallons water.
16 pounds sugar.
6 drops oil of cloves,
6 drops oil of cinnamon, } cut in 1 pint alcohol.

Let it stand sixteen days, draw off, strain and fine if necessary.

No. 27.—BLACKBERRY BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons raspberry brandy.
4 gallons water.
10 pounds sugar.
1 ounce tincture cassia.
1 ounce tincture cardamom-seed.

Color, and let it stand ten days; draw off, and it is ready for use.

No. 28.—RASPBERRY BRANDY.

To 20 gallons pure proof-spirits add:—

25 quarts raspberries.
4 gallons water.
12 pounds loaf sugar.
1 ounce unground cloves.
1 ounce unground cinnamon.

Proceed according to the directions laid down in No. 25.

No. 29.—RASPBERRY BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons water.
16 quarts raspberries.
1 ounce tartaric acid.
6 drops oil of cloves, } cut in alcohol.
6 drops oil of cinnamon, } cut in alcohol.
16 pounds loaf sugar.

Let it stand twenty days, and manage as in No. 25.

No. 30.—RASPBERRY BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons blackberry brandy.
4 gallons water.
6 pints simple sirup.
1 ounce tartaric acid.
1 ounce tincture cardamom-seed.
1 ounce tincture cinnamon.

Color if necessary; let it stand ten days, and draw off. It is then ready for immediate use.

No. 31.—CHERRY BRANDY.

To 20 gallons pure proof-spirits add:—

25 quarts wild cherries, bruised. Let it stand six days, strain it, and add:—
12 pounds loaf sugar.
4 gallons water.

Let it stand eight days, draw off, and fine if necessary.

No. 32.—CHERRY BRANDY.

To 20 gallons pure proof-spirits add:—

3 drachms essential oil of bitter almonds, cut in 1 quart alcohol.
15 pounds sugar.
1 ounce tartaric acid.
5 gallons water.

Color very dark with sugar coloring. Let it stand five days, and it will then be ready for use.

No. 33.—CHERRY BRANDY.

To 20 gallons pure proof-spirits add:—
10 gallons water.
2 drachms oil of bitter almonds, cut in
1 pint alcohol.
30 pounds loaf sugar.
1 ounce tincture cardamom-seed.
1 ounce tincture cinnamon.

Mix well, and color dark with sugar coloring. Let it stand twelve days, and draw off.

No. 34.—CHERRY BRANDY.

To 20 gallons pure proof-spirits add:—
4 gallons water.
18 pounds sugar.
1 pound bruised bitter almonds.
1 ounce tincture cardamom-seed.
1 ounce tartaric acid.
¼ pint orange-flower water.

Color dark with sugar coloring. Let it stand twenty-five days, and draw off.

No. 35.—PEACH BRANDY.

To 20 gallons pure proof-spirits add:—

6 gallons good peach brandy.
4 pounds loaf sugar.
½ drachm essential oil of bitter almonds, cut in alcohol.
½ pint orange-flower water.

Color; let it stand six days, and it is ready for use.

No. 36.—PEACH BRANDY.

To 20 gallons pure spirits add:—

2 gallons peach brandy.
1 drachm essential oil of bitter almonds, cut in alcohol.
3 pounds loaf sugar.

Let it stand three days, and it is ready for use.

No. 37.—ROSE BRANDY.

To 20 gallons pure proof-spirits add:—

5 gallons water.

20 pounds sugar.
30 drops oil of roses, cut in 1 pint alcohol.
½ ounce tartaric acid.

Color with red sanders or tincture of rhatany. Let it stand five days, and it is ready for use.

No. 38.—ROSE BRANDY.

To 20 gallons pure proof-spirits add:—
8 gallons water.
10 pints sirup.
30 drops oil of roses, cut in 1 pint alcohol.
1 ounce tartaric acid.

Color as in No. 37, and let it stand five days.

No. 39.—LEMON BRANDY.

To 20 gallons pure proof-spirits add:—
20 lemons, sliced.
16 pounds sugar.
¼ pound lemon peel.
½ ounce crushed nutmeg.

Let it stand ten days, and draw off.

No. 40.—LEMON BRANDY.

To 20 gallons pure proof-spirits add:—
15 lemons, sliced.
12 pounds sugar.
½ pound lemon peel.
1 quart good brandy.
Let it stand ten days, and draw off.

No. 41.—ORANGE BRANDY.

To 20 gallons pure proof-spirits add:—
25 oranges, sliced.
15 pounds loaf sugar.
1 quart good brandy.
Let it stand fourteen days, and draw off.

No. 42.—ORANGE BRANDY.

To 20 gallons pure proof-spirits add:—
18 oranges, sliced.
12 pounds sugar.
1 quart brandy.
1 ounce tartaric acid.
Let it stand ten days, and draw off.

No. 43.—PINE-APPLE BRANDY.

To 20 gallons pure proof-spirits add:—

10 pine-apples, sliced.
14 pounds loaf sugar.
2 quarts good brandy.
1 ounce tincture saffron.

Let it stand ten days; then draw it off ready for use.

No. 44.—PINE-APPLE BRANDY.

To 20 gallons pure proof-spirits add:—

8 pine-apples, sliced.
6 pints simple sirup.
1 quart good brandy.
1 ounce cassia.
1 ounce tincture saffron.
4 gallons water.

Proceed as in No. 43.

No. 45.—CARAWAY BRANDY.

To 20 gallons pure proof-spirits add:—

10 gallons water.

3 pounds caraway-seed, bruised.
1 gallon good brandy.
½ pint orange-flower water.
25 pounds loaf sugar.

Mix, color, and let it stand fourteen days; then draw off ready for use.

No. 46.—GINGER BRANDY.

To 20 gallons pure proof-spirits add:—

1 ounce tincture cardamom-seed.

Take ½ pound bruised ginger root, digested in ½ gallon strong alcohol for six days. Add the liquor, after having been filtered, to the pure spirits, agitating it thoroughly. Then add:—

5 gallons pure soft water.
1 gallon simple sirup.

Color with sugar coloring ready for use. If more flavor is required, use more ginger; if sweetness is wanted, use more sirup.

No. 47.—LAVENDER BRANDY.

To 20 gallons pure proof-spirits add:—

2 drachms oil of lavender, cut or dissolved for twelve hours in strong alcohol.

6 gallons pure soft water.

1 ounce tincture cinnamon.

1 gallon simple sirup.

Color with sugar coloring, adding more lavender or sirup, if more flavor or sweetness is required.

GIN.

GIN, or GENEVA, from *Genievre*, (*Juniper*,) is a kind of ardent spirits manufactured in Holland, therefore called *Hollands Gin* in this country, being different from the gin manufactured in Great Britain; and both the Hollands and British gin differing entirely from the article generally sold by dealers under the name of gin, or Hollands gin,—the latter being generally nothing but pure spirits, flavored with *juniper*, *turpentine*, and small quantities of some of the aromatics, etc.

Schiedam Hollands has the reputation of being the best gin, and consequently commands the highest price. *Rotterdam* is likewise a fine article.

The peculiar and excellent flavor of Hollands gin, or spirits, depends on the particular mode of its manufacture, and not, as many suppose, on the large or small quantity of juniper-berries employed, its flavor differing materially from the flavor extracted from juniper. A large majority of the Dutch distillers combine a little Strasburg turpentine and a small quantity of hops with the juniper-berries before rectification, the fine aroma which distinguishes the best gin being partly due to the turpentine employed.

"The material employed in the distilleries of Schiedam are, two parts of unmalted rye from Riga, weighing about 37 pounds per bushel. The mash tun, which serves also as the fermenting tun, has a capacity of nearly seven hundred gallons, being about five feet in diameter at the mouth, rather narrower at the bottom, and four and a half feet deep; the stirring apparatus is an oblong rectangular iron grid, made fast to a wooden pole. About a barrel—

36 gallons—of water, at a temperature of from 162° to 168°, (the former heat being best for the most highly-dried rye,) is put into the mash tun for every 1½ cwt. of meal, after which the malt is introduced and stirred, and lastly the rye is added. Powerful agitation is given to the magma, till it becomes quite uniform, a process which a vigorous workman piques himself upon executing in the course of a few minutes. The mouth of the tun is immediately covered over with canvas, and further secured by a close, wooden lid, to confine the heat. It is left in this state for two hours. The contents being then stirred up once more, the *transparent* spent-wash of a preceding washing is first added, and next as much cold water as will reduce the temperature of the whole to about 85° Fahr. The best Flanders yeast, which had been brought for the sake of carriage to a doughy consistence by pressure, is now introduced to the amount of one pound for every one hundred gallons of the mashed ma-

terial. The gravity of the fresh wort is usually from thirty-three to thirty-eight pounds, per Dycas's hydrometer; and the fermentation is carried on from forty-eight to sixty hours, at the end of which time the attenuation is from seven to four pounds,—that is, the specific gravity of the supernatant wash is from 1·007 to 1·004.

"The distillers are induced, by the scarcity of beer barm in Holland, to skim off a quantity of the yeast from the fermenting tuns, and to sell it to the bakers, whereby they obstruct materially the production of spirits, though they probably improve its quality, by preventing its impregnation with yeasty particles—an unpleasant result, which seldom fails to take place in the whiskey distilleries of the United Kingdom.

"On the third day after the fermenting tun is set, the wash containing the grains is transferred to the still, and converted into low wines. To every one hundred gallons of this liquor two pounds of juniper-berries, from three to five years old, being added, along with about one-quarter pound of salt, the whole is put into the low wine still, and the fine Hollands spirits is drawn off by a gentle and well-regulated heat, till the magma becomes exhausted, the first and the last products being mixed together, whereby a spirit of two to three per cent. above our hydrometer proof is obtained, possessing the peculiarly fine aroma of gin. The quantity of spirit varies from eighteen to twenty-one gallons per quarter of grain; this large product being partly due to the employment of the spent wash of the preceding fermentation, an addition which contributes at the same time to improve the flavor."—(*Ure's Arts and Manuf.*)

"Robert Moore, Esq., distiller, formerly of Underwood, after studying the art at Schiedam, tried to introduce that spirit into general consumption in England, but found the palates of the gin-drinkers too much corrupted to relish so pure a beverage."

Gin has thus far proved more difficult to imitate than any of the other liquors, it being almost impossible to impart the exact flavor of the *true* Hollands gin to any of its imitations. The author of this work has, however, been so fortunate as to succeed in making an imitation out of pure spirits, which has been pronounced by good judges a genuine article.

There is more care required in combining the proper quantities of the different ingredients, in making imitations of Hollands gin, than in the imitations of wines and brandies, so as to insure the peculiar *flavor*, *creaminess*, and *smoothness* of the real article. The reader will find the imitations of gin made in accordance with the formulæ hereafter given superior to most of the gins furnished to dealers, they being either *too much reduced*, or, if imitations, *too highly flavored*—it being necessary, in securing a good imitation, to guard against both extremes.

One great difficulty in *imitating* gin is the want of skill in the operator. Unless this is possessed, he had better depend upon *reducing* with pure spirits, as given in the formulæ for *reduced gins.* After having acquired the requisite skill, by experimenting in a small way, he can then go on with the *imitations of pure gin.*

IMITATIONS OF GIN.

No. 1.—GIN.

To 20 gallons pure spirits (5 o. p.) add:—

5 gallons gin, to be imitated; then take
1 pound juniper-berries.
2 drachms caraway-seed.
½ ounce spirits nitre.
1 drachm pure oil of turpentine.

Digest for eight days in 1 gallon strong alcohol, agitating occasionally; filter through paper, add the liquor slowly to the pure spirits and gin, and mix thoroughly, adding 1 pint simple sirup, or more if required.

No. 2.—GIN.

To 20 gallons pure spirits (10 o. p.) add:—

3 gallons gin. Then take

1¼ pounds juniper-berries.
2 drachms pure oil of turpentine.
1 drachm fennel-seed.
1 drachm caraway-seed.

Digest eight days in 1 gallon strong alcohol; filter through paper; add the liquor to the pure spirits and gin, mix thoroughly, and add sirup as before.

No. 3.—GIN.

To 20 gallons pure spirits (10 o. p.) add:—
2 gallons pure gin, as before. Then take
1¼ pounds juniper-berries.
½ ounce caraway-seed.
3 lemons, sliced.
2 drachms pure oil of turpentine.
1 ounce spirits nitre.

Digest for ten days in 1 gallon strong alcohol; filter as before, and add to the pure spirits and gin, with 1½ pints simple sirup; mix as before.

No. 4.—GIN.

To 20 gallons pure spirits (10 o. p.) add:—
2 gallons pure gin. Then take
2 drachms pure turpentine.
1 drachm oil of juniper.
2 drachms caraway-seed.

Digest in ½ gallon strong alcohol five days, then add slowly to the pure spirits and gin, after filtering, mixing thoroughly all the time; add 1½ pints simple sirup.

No. 5.—GIN.

To 20 gallons pure spirits (10 o. p.) add:—
1 ounce spirits nitre.
1 pint simple sirup.
1½ drachms oil of juniper, and
1 drachm pure oil of turpentine, cut in 1 quart strong alcohol.

Add slowly, agitating all the time. Let it stand two days.

No. 10.—GIN.

To 20 gallons pure spirits (10 o. p.) add:—

2 drachms oil of juniper,
2 drachms pure oil of turpentine, and
1 drachm oil of caraway, all cut in 2 quarts strong alcohol.

Mix thoroughly, and add 2 pints simple sirup.

REDUCED GINS.

No. 11.—GIN.

To 20 gallons pure proof-spirits add:—
10 gallons pure gin.
1½ pints simple sirup.

Mix well.

No. 12.—GIN.

To 20 gallons pure proof-spirits add:—
8 gallons pure gin.
1½ pints sirup.
1 ounce spirits nitre.

Mix.

No. 13.—GIN.

To 20 gallons pure proof-spirits add:—
6 gallons pure gin.
2 pints sirup.
1 drachm pure oil of turpentine, cut in 1 pint alcohol.

Mix.

No. 14.—GIN.

To 20 gallons pure spirits add:—

5 gallons pure gin.
2 pints sirup.
2 drachms oil of turpentine, cut in 1 pint alcohol.
1 ounce spirits nitre.

Mix.

RUM.

Rum is a kind of ardent spirits obtained by distillation from the fermented skimmings of the sugar teaches, mixed with molasses, and diluted with water, and sometimes from the juice of the sugar-cane. The best rum is brought from *Jamaica*, *St. Croix* being next in quality. The following account of its mode of manufacture is given by Dr. Ure, in his valuable dictionary on the Arts, Manufactures, and Mines:—

"A sugar plantation in Jamaica, or Antigua, which makes 200 hogsheads of sugar of about 16 cwt. each, requires, for the manufacture of its rum, two copper stills—one of 1000 gallons for the wash, and one of 600 gallons for the low wines—with corresponding worm refrigeratories. It also requires two cisterns, one of 3000 gallons for the lees, or spent wash of former distillations, called *dunder,* (*quaisi redundar*, SPAN.) another for the skimmings of the clarifiers and teaches of the sugar-house; along with twelve or more fermenting cisterns or tuns.

"Lees that have been used more than three or four times are not considered to be equally fit for exciting fermentation, when mixed with the sweets, as fresher lees. The wort is made in Jamaica by adding to 1000 gallons of *dunder* 120 gallons of molasses, 720 gallons of skimmings, (= 120 of molasses in sweetness,) and 160 gallons of water; so that there may be in the liquid nearly twelve per cent. of solid saccharum. Another proportion often used is 100 gallons of molasses, 200 gallons of lees, 300 gallons of skimmings, and 400 gallons of water; the mixture containing, therefore, fifteen per cent. of sweets. These two formulæ prescribe so much spent wash, according to my opinion, as would be apt to communicate an unpleasant flavor to the spirits. Both the fermenting and flavoring principles reside chiefly in the fresh cane-juice, and in the skimmings of the clarifier; because, after the sirup has been boiled, they are in a great measure dissipated. I have made many experiments upon fermentation and distillation from West India molasses, and always found the spirits to be perfectly exempt from any rum flavor.

"The fermentation goes on most uniformly and kindly in very large masses, and requires from nine to fifteen days to complete, the difference in time depending upon the strength of the wort, the condition of its fermentable stuff, and the state of the weather. The progress of the attenuation of the wash should be examined from day to day with a hydrometer. When it has reached nearly to its maximum, the wash should be as soon as possible transferred by pumps into the still, and worked off at a properly-regulated heat; for, if allowed to stand over, it will deteriorate by acetification. Dr. Higgins's plan of suspending a basketful of limestone in the wash-tuns, to counteract the ascidity, has not, I believe, been found to be of much use. It would be better to cover up the wash from the contact of atmospheric air, and to add, perhaps, a very little sulphite of lime to it, both of which means would tend to arrest the acetous fermentation. But one of the best precautions against the wash becoming sour, is to preserve the utmost cleanliness among all the vessels in the distillery. They should be scalded, at the end of every round, with boiling water and quicklime.

"About 115 gallons of proof-rum are usually obtained from 1200 gallons of wash. The proportion which the product of rum bears to that of sugar, in very moist, rich plantations, is rated by Edwards at 82 gallons of the former to 16 cwt. of the latter; but the more usual ratio is 200 gallons of rum to 3 hogsheads of sugar. But this proportion will necessarily vary with the value of rum and molasses in the market,—since, whichever fetches the most remunerating price, will be brought forward in the greatest quantity. In one considerable estate in the Island of Granada, 92 gallons of rum were made for every hogshead (16 cwt.) of sugar."

Rum owes its peculiar taste and flavor to a small portion of *volatile oil* and *butyric acid,* which it contains. A good imitation of pure Jamaica rum may be obtained by carefully adding to pure spirits, 10 o. p., the ingredients found by analysis to be combined in Jamaica rum.

No. 4.—ST. CROIX RUM.

To 20 gallons pure spirits add:—

- 5 gallons St. Croix rum.
- 1 ounce acetic acid.
- 1½ pints simple sirup.
- ½ ounce tincture catechu.
- 1 ounce butyric acid, cut in alcohol, as before.

Let stand five days, after slightly coloring with sugar coloring.

No. 5.—ST. CROIX RUM.

To 20 gallons pure spirits add:—

- 3 gallons St. Croix rum.
- 1 pint simple sirup.
- 1 ounce tincture catechu.
- ¾ ounce butyric acid, cut in alcohol, as before.

Let stand five days, after coloring as before.

WHISKEY.

WHISKEY is diluted alcohol, distilled from the fermented worts of malt or grains.

Whiskey, from the Irish word *usquebaugh*, is the name of the spirituous liquor manufactured by our distillers, and corresponds to the *eau de vie* of the French, and the *brantwein* of the Germans.

It is produced or generated by that intestine change which grape-juice and other gluto-saccharine liquids spontaneously undergo when exposed to the atmosphere at common temperatures, as explained in another section of this work. The production of whiskey depends on the simple fact that, when any vinous fluid is boiled, the alcohol, being very volatile, evaporates first, and may thereby be separated from the watery vegetable infusion in which it took its birth.

Whiskey obtained from the distillation of fermented wort is most esteemed.

Barley, *rye*, and *corn* are the species of grain most commonly employed in this country for making whiskey. Barley is mostly taken, either partly or altogether, in the malted state; while the other corns are not malted, but merely mixed with a certain proportion of barley malt, to flavor the saccharine fermentation in the mashing.

The malting for distilleries ought to be conducted on the same principle as for the breweries. The malt ought to be lightly kiln-dried, at a steam heat, instead of a fire, which gives the empyreumatic smell to the grain that passes into the spirits. If, however, the empyreumatic or smoky flavor, relished by some whiskey drinkers, be desired, the malt should be dried by a turf fire, as is done in Scotland, whereby the whiskey will acquire that peculiar odor of burnt turf called "*peat-reek*" in Scotland.

Whiskey is likewise obtained from wheat, buckwheat, oats, and potatoes, as well as from corn, rye, and barley, each variety having some peculiar or distinguishing characteristic.

Fine imitations of *Scotch* and *Irish, Old Rye Monongahela, Wheat,* and *Bourbon Whiskeys* may be made by the following formulæ, the basis being pure spirits, the same as used for making brandies, gins, etc.

liquor, however, become milky, an addition of pure spirits will often rectify the evil.

It is frequently necessary to filter cordials which are not perfectly fine. This may be done by adding or mixing a small quantity of magnesia with the article requiring filtration; then run it through a fine, clean wine-bag.

The best plan for dealers who make large quantities of cordials, is to have *three* barrels of sweetened spirits ready prepared, of about 65 u. p. The one containing two pounds of sugar to the gallon, the second three pounds, and the third four pounds to the gallon, so that any sweetness required may soon be obtained. The essential oils to be cut in strong alcohol, may be in the proportion of one drachm to the pint, and should not be used until having stood, say from twelve to twenty-four hours. The best plan is to have all the different solutions of the oils which may be required on hand, which will considerably expedite the manufacture of whatever kind may be demanded.

The very best quality of sugar is required, so as to insure a fine, transparent sirup, which must be made according to the instruction in the appendix.

Cordials which require fining may be fined with the whites of six to ten eggs to the barrel, or by the addition of a little alum, either alone or followed by a little carbonate of soda or potassa, dissolved in water. In from ten days to two weeks the liquor will be clear.

CORDIALS.

No. 1.—ROSE CORDIAL.

To 6 gallons pure proof-spirits add:—
60 drops oil or ottar of roses, cut in 1 pint strong alcohol.
4 gallons clear soft water.
1¾ gallons simple sirup.

Agitate thoroughly, and if not sweet enough add more sirup. Color with tincture of red sanders.

No. 2.—ROSE CORDIAL.

To 5 gallons pure proof-spirits add:—
40 drops ottar of roses, cut in alcohol.
3 gallons clear soft water.
1½ gallons simple sirup.

Color and agitate as before, adding more flavoring and sirup if required. It may be reduced by adding more water.

No. 3.—ANISE-SEED CORDIAL.

To 6 gallons pure proof-spirits add:—
1 drachm of the essential oil of anise-seed, cut in alcohol.
4 gallons clear soft water.
1¾ gallons simple sirup.

Agitate as before, and proceed as directed in No 2.

No. 4.—ANISE-SEED CORDIAL.

To 5 gallons pure proof-spirits add:—
1 drachm oil of anise-seed, cut in alcohol, as before.
3 gallons clear soft water.
1½ gallons simple sirup.

Agitate, and manage as directed in formula No. 2.

No. 5.—ANISE-SEED CORDIAL.

To 1 pound bruised anise-seed add:—
6 gallons pure proof-spirits. Digest for ten days, and then add:—
3 gallons clear soft water.
1¾ gallons simple sirup.

Agitate; filter if required, and manage as in No. 2.

No. 6.—CITRON CORDIAL.

To 2 pounds rind of yellow citrons add:—
½ pound orange peel.
1 ounce bruised nutmegs.
6 gallons proof-spirits. Digest for twelve days, filter, and add:—
3 gallons clear soft water.
1¾ gallons simple sirup.

Agitate, and proceed as in No. 2.

No. 7.—CINNAMON CORDIAL.

To 6 gallons proof-spirits add:—
2 drachms essential oil of cinnamon, cut in 1 quart strongest alcohol.

3 gallons clear soft water.
1¾ gallons simple sirup.

Agitate thoroughly, and proceed as in No. 2.

No. 8.—CINNAMON CORDIAL.

To 5 gallons pure proof-spirits add:—
2 drachms essential oil of cinnamon, cut in alcohol, as before. Then add
10 drops essence of lemon.
10 drops essence of orange-peel.
2 drachms cardamom-seeds, bruised. Digest for eight days, filter, and add:
3 gallons water.
1½ gallons simple sirup.

Agitate, and proceed as in No. 2.

No. 9.—CLOVE CORDIAL.

To 6 gallons pure proof-spirits add:—
1 drachm essential oil of cloves, cut in strong alcohol.
3 gallons clear soft water.
2 gallons simple sirup.

Color dark with sugar coloring. Agitate thoroughly, and manage as in No. 2.

No. 10.—CLOVE CORDIAL.

To 1½ ounces bruised cloves add:—

5 gallons pure proof-spirits.
2 drachms bruised allspice. Digest for ten days, then filter, and add:–
3 gallons clear soft water.
2 gallons simple sirup.

Agitate, and manage as in No. 2. Color.

No. 11.—PEPPERMINT CORDIAL.

To 6 gallons pure proof-spirits add:—

1 drachm essential oil of peppermint, cut in 1 quart strong alcohol, which has first stood for twenty-four hours, and agitated frequently; then add:
6 gallons pure soft water.
2 gallons simple sirup.

Agitate thoroughly, and, if not clear, dissolve 2 drachms of alum in a pint of rain water;

add it to the cordial, agitate for five minutes, and let it stand ten days.

No. 12.—LEMON CORDIAL.

To 5 ounces fresh lemon-peel,
5 ounces dried lemon-peel, and
5 ounces dried orange-peel, add:—
5 gallons pure proof-spirits. Digest for ten days, draw off, and add:—
3 gallons clear soft water.
1½ gallons simple sirup.

Proceed as in No. 2. Color, if required.

No. 13.—ORANGE CORDIAL.

To 3 pounds fresh orange-peel,
2 pounds dried orange-peel, and
½ pound fresh lemon-peel, add—
5 gallons pure proof-spirits. Digest for ten days, draw off, and add:—
3 gallons clear soft water.
1½ gallons simple sirup.

Agitate, and manage as in No. 2. Color.

No. 14.—STRAWBERRY CORDIAL.

To 5 gallons pure proof-spirits add:—
4 quarts sirup of strawberries.
3 gallons clear soft water.
1½ gallons simple sirup.

Agitate, and manage as in No. 2. Color, if required. This is a fine article.

No. 15.—STRAWBERRY CORDIAL.

To 8 quarts strawberries add:—
5 gallons pure spirits. Digest for ten days, draw off, and add:—
3 gallons clear soft water.
2 gallons simple sirup.

Agitate, and manage as before. Color, if required.

DISTILLATION.

DISTILLATION (DESTILLIREN, German) is the manufacture (commercially speaking) of spirituous or intoxicating liquors; comprising the operations of *mashing* the vegetable materials which furnish the basis for the formation of the alcohol; *cooling* of the worts, which brings them to the most favorable temperature for exciting the third process—*fermentation;* the fourth and last process being the separation of the alcohol, with a certain proportion of water, by means of a *still.*

The following condensed article, from Ure, on the above subject, will be found interesting to the reader:—

Whiskey, as before remarked, is generated by that intestine change which grape juice and other glutino-saccharine liquids spontaneously undergo when exposed to the atmosphere at common temperatures. Sugar is the only substance which can be transformed into alcohol. Whatsoever seeds, fruits, or roots afford juices or extracts capable of conversion into vinous liquor, either contain sugar ready formed, or starch, susceptible of acquiring the saccharine state by proper treatment. In common language, the intoxicating liquor obtained from the sweet juices of fruits is called *wine*, and that from the infusions of farinaceous seeds, *beer*, though there is no real difference between them in chemical constitution. *Wine*, *cider*, *beer*, and *fermented wash* of every kind, when distilled, yields an identical intoxicating spirit, which differs in these different cases merely in flavor, in consequence of the presence of a minute quantity of volatile oils of different odors.

The juices of sweet fruits contain a glutinous ingredient, which acts as a ferment in causing their spontaneous change into a vinous condition; but the infusion of seeds, even in their germinated or malted state, requires the addition of a glutinous substance called *yeast* to excite the *best* fermentation. In the fabrication of wine or beer for drinking, the fermentative action should be arrested before all the fruity saccharum is decomposed; nor should it, on any account, be suffered to pass into the *acetous* stage: whereas, for making distillery wash, that action should be promoted as long as the proportion of alcohol is increased, because the formation of a *little* acetic acid is not injurious to the quality of the distilled spirit, but rather improves its flavor by the addition of *acetic ether*, while all the decomposed sugar is lost. The distillers in the United Kingdom operate upon the saccharine matter from corn of various kinds by drawing off a pure watery extract from the grain, and subjecting this species of wort to fermentation; while the distillers of Germany, Holland, and the north of Europe, ferment and distill the infused mass of grains; the latter plan being less economical, more uncertain in the product, and affords a cruder spirit, a fetid volatile oil being evolved from the husks in the still. The substances employed by distillers may be distributed into the following classes:—

1. *Saccharine juices.* At the head of these stands cane-juice, containing (fresh from the mill) from 12 to 16 per cent. of raw sugar, and enters into the vinous fermentation without the addition of yeast, producing rum, which is possessed of a peculiar aroma, derived from an essential oil in the cane. An inferior sort of rum is made from molasses, mixed with the skimmings and washings of the sugar-pans. When molasses, or treacle, is diluted with water, and cooled to the proper temperature, and yeast added, fermentation will ensue, and a spirit be generated which, when distilled, has none of the aroma of rum, proving the source whence the aroma comes. Cane-juice under-

goes the vinous fermentation, however, much more slowly and irregularly without the addition of a ferment than with it. It is therefore quickened by the addition of the lees of a preceding distillation.

The sweet juices of *palm-trees* and *cocoa-nuts*, as also of the *maple*, *ash*, *birch*, etc., when treated like cane juice, afford vinous liquors from which ardent spirits, under various names, are obtained, as *arrack*, etc., the quantity being about 50 pounds of alcohol of 0·825 for every 100 pounds of solid saccharine extract present. *Honey*, similarly treated, affords the *metheglin* so much prized by our ancestors.

2. The juices of *apples*, *pears*, *currants*, and such fruits, afford, by fermentation, quantities of alcohol proportionate to the sugar they contain. *Cherries* are employed in Germany, and other parts of the continent, for making a high-flavored spirit called *kirsch-wasser*, or cherry-water. The ripened red fruit of the *mountain ash* constitutes a good material for vinous fer-

mentation, producing one gallon and a half of alcohol from two bushels of the ripe berries. *Beet-roots*, *carrots*, and *parsnips* also yield, by proper process, a considerable quantity of alcohol.

II. *Ardent spirits or whiskey from fecula or starchy materials.* As starch is transformed into a saccharine condition by malting and mashing, and a fermentable wort may be obtained from starchy meal, so may, by like operations, all vegetable substances which consist chiefly of starch become materials for a whiskey distillery. To this class belong all the *farinaceous grains*, *potatoes*, and the *pods of shell-fruits*, as *beans*, *vetches*, *horse-chestnuts*, *acorns*, etc.

1. *Whiskey from corn.* All those species of corn which are employed in breweries answer for distilleries; as *wheat*, *rye*, *barley*, and *oats*, as well as *buckwheat* and *Indian corn.* The product of spirits which these different grains afford depends upon the proportion of starch they contain, including the small quantity of

uncrystallizable sugar present in them. According to Hermstædt, 100 pounds of starch should yield 35 pounds of alcohol, or 4·375 gallons imperial; equal to 7·8 gallons of spirits, excise proof.

One hundred pounds of the following grains afford, in spirits of specific gravity 0·9427, containing 45 per cent of absolute alcohol, (= $\frac{9}{11}$ of British proof,) the following quantities:—Wheat, 40 to 45 pounds of spirits; rye, 36 to 42; barley, 40; oats, 36; buckwheat, 40; Indian corn, 40. The chief difference in these several kinds of corn consists in their different bulks under the same weight—a matter of considerable importance; for, since a bushel of oats weighs little more than the half of a bushel of wheat, it becomes less convenient in use, though it affords a good spirit.

It is deemed preferable to use a mixture of several sorts of grain instead of a single one. For example, wheat with barley and oats, or barley with rye and wheat; for the husks of the oats diffused through the wheat flour and rye meal keep it open, or porous, when mashed, and thus favor the abstraction of the wort; while the gluten of the wheat tends to convert the starch of the barley and oats into sugar. When the whole of the grain, however, is malted, a much more limpid wort is obtained than from a mixture of malt with raw grain; hence the pure malt is preferable for the ale and porter brewer, while the mixture affords a larger product, at the same cost of materials, to the distiller. When barley is the only grain employed, from one-third to one-sixth of malt is usually mixed with it; but when wheat and rye are also taken, the addition of from one-eighth to one-sixteenth of barley malt is sufficient. Oats are peculiarly proper to be mixed with wheat, to keep the meal open in the mashing.

1. MASHING. — Barley and raw grain are ground to meal by millstones, but malt is merely crushed between rollers. If only one-

tenth or one-eighth of malt be used with nine-tenths or seven-eighths of barley, some husks of oats are added to render the mash-mixture more drainable.

When 40 bushels of barley and 20 of malt form one mashing, from 600 to 700 gallons of water, heated to 150° Fahr., are mixed with these 60 bushels in the mash-tun, and carefully incorporated, by much manual labor with wooden oars, or in great concerns by the mechanical apparatus used in the breweries. This agitation must be continued for two or three hours, with the addition, from time to time, of about 400 additional gallons of water, at a temperature of 190°, to counteract the cooling of the materials. But since the discovery of the *diastase*, as the best heat for saccharifying starch is shown to be not higher than 160° Fahr., it would be far better to mash in a tun, partially, at least, steam incased, whereby we could preserve the temperature at the appropriate degree for generating the greatest quantity of sugar.

If the wort be examined every half hour of the mashing period, it will be found to become progressively sweeter to the taste, thinner in appearance, but denser in reality.

The wort must be drawn off from the grains whenever it has attained its maximum density, which seldom exceeds 150 pounds per barrel; that is $\frac{360+150}{360}=1{\cdot}42$, or 42 per cent. As the corn of the distiller of raw grain has not the same porosity as the brewer's, the wort cannot be drawn off from the bottom of the tun, but through a series of holes, at the level of the liquor, bored in a pipe stuck in at the corner of the vessel. About one-third only of the water of infusion can thus be drawn off from the pasty mass. More water is therefore poured on at the temperature of 190°, well mixed by agitation for half an hour, then quietly infused for an hour and a half, and finally drawn off as before. Fully 400 gallons of water are used upon this occasion, and nearly as much liquor may be drawn off. Lastly, to extract from the grains everything soluble, about 700 gallons of boiling hot water are turned in upon them, thoroughly incorporated, then left quietly to infuse, and drawn off as before. This weak wort is commonly reserved for the first liquor of the next mashing operation, upon a fresh quantity of meal and malt.

With the proportion of malt, raw grain, and water above prescribed, the infusion first drawn off may have a strength = 20 per cent. = specific gravity 1·082, or 73 pounds per barrel; the second of 50 pounds per barrel, or 14 per cent.; and the two together would have a strength of 61·2 pounds per barrel = 17 per cent., or specific gravity 1·070. From experiments carefully made, upon a considerable scale, it appears that no more than four-fifths of the soluble saccharo-starchy matter of the worts is decomposed, in the best regulated fermentations of the distiller from raw grain. For every 2 pounds so decomposed, 1 pound of alcohol, specific gravity 0·825, is generated;

and as every gallon of spirits of the specific gravity of 0·909 contains 4·6 pounds of such alcohol, it will take twice 4·6, or 9·2 pounds of saccharine matter to produce the said gallon. To these 9·2 pounds, truly transmuted in the process, we must add one-fifth, or 1·84 pounds, which will raise to 11·04 the amount of solid matter employed in producing a gallon of the above spirits.

2. As the imperfect saccharine infusion obtained from raw grain is much more acescent than the rich sugary solution got from malt in the breweries, the distiller must use every precaution to cool his worts as quickly as possible, and to keep them clear from any acetous taint. As the worts cool, a quantity of starchy matter is precipitated, but it is all carefully swept along into the fermenting tun, and undoubtedly contributes to increase the production of alcohol. During the winter and temperate months, when the distilleries are most actively at work, the temperature at which the worts are set is usu-

ally about 70° Fahr. When much farinaceous deposit is present, the heat may be only 65°; because, in this case, a slow fermentation seems to favor the conversion of that starch into sugar. In some German distilleries a little chalk is mixed with the worts to check acidity.

3. THE FERMENTATION.—The yeast added to the worts as a ferment ought to be the best top barm of the porter breweries. About one gallon of it is requisite for every two bushels of meal and wort worked up in the mashing process; and of this quantity only a certain proportion is introduced at the beginning, the remainder being added by degrees on the second and third days. Should the fermentation flag, a little more may be added on the fourth or fifth day, and the contents of the tun may be roused by an agitator. About eight or nine gallons may be introduced four days in succession to the quantity of worts extracted from 60 bushels of the farinaceous materials; or the third day's dose may be intermitted, and joined

to the fourth on the subsequent days. As regards the periods for administering the yeast, distillers should be governed very much by the appearance of the fermentation. This process continues from nine to twelve, or even fourteen days, according to circumstances, the tuns being left quite open during the first five days, but being covered moderately close afterwards to favor the full impregnation of the liquor with carbonic acid as a fermenting agent. In consequence of the great attenuation of the wort by the generation of so much alcohol, no good body of yeast continues to float on the surface, and what is formed is beat down into the liquor on purpose to promote the fermentation. The temperature of the wash gradually increases till toward the end of the fourth day, when it attains its maximum height of about 25° above the pitch of 55° or 60°, at which it may have been set. The time of the greatest elevation of temperature, as well as its amount, depends conjointly upon the quality of the yeast, the nature of the saccharo-starchy matter, and the state of the weather. It is highly probable that the electrical condition of the atmosphere exercises a considerable influence upon fermentation, as thunder-storms possess the power to sour vinous fluids. The diminution of the density of the wort is carefully watched by the distiller. This attenuation, as he calls it, is owing partly to the decomposition of the sugar, which communicated its gravity to the solution, and partly to the introduction of the lighter alcoholic particles. Were all the saccharo-starchy matter resolved into gaseous compounds, the wort would become water; but since a part of it remains undecomposed, and a portion of alcohol is produced at the expense of the decomposed part, the degree of attenuation becomes a somewhat complicated problem in a theoretical point of view; the density due to the residuary sugar being masked and counteracted by the spirit evolved. Could the alcohol be drawn off as it is formed, the attenuation would probably become greater, because the alcohol checks the fermentative action, and eventually stops it, before all the saccharum is decomposed.

The maximum quantity of proof-spirits obtained on the great scale, at any time, from raw grain mixed with from one-fourth to one-eighth of malt, seems to be twenty-two gallons per quarter.

Bezelius says that there are distillers who are guilty of putting a little arsenious acid into the still; that the spirits contain, pretty frequently, traces of arsenic, which may be detected by adding to them a little muriatic acid, then evaporating off the alcohol, and passing a current of sulphureted hydrogen gas through the residuary liquid, which will give it the characteristic orpiment yellow tinge, arsenic being present. No arsenic is ever used in this country.

When *damaged* grain has been mashed in making whiskey, a peculiar oily substance makes its appearance in it. On approaching the nostrils to such whiskey slightly heated, this volatile matter irritates the pituary membrane and the eyes powerfully. Such whiskey, intoxicates more powerfully than pure alcohol of equal strength, and produces even temporary frenzy, with subsequent sickness and disordered functions. This oil may be extracted from diluted alcohol by agitating it with an unctious oil, and then distilling the oil along with water. At the end of three or four months, this volatile matter disappears in a great measure, even when the spirits which contain it are inclosed in well-corked bottles, obviously from its undergoing a spontaneous decomposition.

When *acetic ether* is added to well purified or clean spirits, such as the distillers call silent whiskey, it gives it somewhat the flavor of brandy. For this purpose also, the spirits are rectified from bruised prunes, or the lees of the Cognac distilleries, whereby they acquire additional flavor. The astringent taste of old brandy is imitated by the introduction of a little catechu into the British spirits. Burned sugar is employed as the coloring in these imitations.

The quantity of spirits obtained from other vegetable substances depends upon the skill and manner in which the different processes are conducted.

Potatoes may yield from 16 to 22 pounds measure of spirits, from every 100 pounds of potatoes; or about 1¾ gallons.

Horse-chestnuts yield 34 pounds of spirits, containing 36 per cent. of absolute alcohol.

After the first distillation of whiskey or pure spirits is finished, our next object is to deprive or free the distilled liquors, before mentioned, from all the impurities which may have passed over in the first distillation. For this purpose they must undergo the process of

Rectification, which consists in passing the spirits through well burned, and properly pulverized charcoal, distributed through a series of cylindrical casks, placed so that the liquor may run evenly through the charcoal and other material, care having been taken in properly mixing the *raw whiskey* and *water;* otherwise the water would pass through first, from the fact of the high wines containing such a quantity of oil as to render them much lighter than the water, which, unless thoroughly mixed, would remain on top.

Any number of casks may be used; each one must have a double bottom, the false one being perforated with conical or round holes about one-half inch in diameter, and placed a few inches above the true. Upon this perforated bottom, a layer of clean chopped straw, or cleanly carded cotton, or a woolen blanket is laid, and over the straw, woolen blanket, or cotton, a stratum of clean gravel, the size of large peas; on the gravel place six inches of coal, then one-half peck of barley malt, then fill up to within one and a half feet of the top, with coal; then a woolen blanket, covered with another layer of gravel; then fill up to within eight inches of the top with coal. You may thus have any number of casks, the contents all passing by a tin tube, furnished with funnels under each respective cask, into one common receiver.

The *better plan* is, to have two series of casks, one above the other; a mixer placed over the upper series of casks, the raw whiskey passing slowly, by means of a faucet and pipes, into the upper series of casks; passing from the upper series, through faucets, into the lower series, and through the lower series of casks into a common receiver; the whole to be so regulated as to run slowly and evenly through the rectifiers, passing into the receiver in the same volume as out of the mixer; by so doing, the coal remains good for a long time, saving both trouble and expense.

When two series of casks or rectifiers are used, the upper rectifiers may be filled entirely with coal (after having placed a woolen blanket over the perforated bottom, and a layer of pebbles or gravel,) to within ten inches of the top. All the casks are to be kept closely covered, thereby preventing evaporation. The coal from the top of the *lower* rectifiers may be removed to the depth of eight inches every six months, and from the top of the *upper* rectifiers, once every *three* months, and replaced by fresh coal; the upper rectifiers requiring more frequent renewals, owing to the larger accumulation of verdigris and other impurities.

Always use the best coal the market affords, and keep your rectifiers in constant use, or the coal will become unfit for use. To pack *upper-spirit rectifiers*, follow the directions for upper-whiskey rectifiers.

To pack *lower-spirit rectifiers*, use about one peck of lime, in place of the barley malt, and proceed as for lower-whiskey rectifiers.

When spirits are very crude, or impure, it has been found necessary to pass them through six or eight successive series of rectifiers before they were deprived of their rank flavor.

VINEGAR.

VINEGAR (VINAIGRE, *French;* ESSIG, *Germ.;*) is a sour liquid, the product of the acetous fermentation. All liquids which are susceptible of vinous fermentation, may be made to yield vinegar. Sugar and water, infusions of malt, wine, and cider, and saccharine vegetable juices, when subjected to the action of a ferment, and exposed to air and the proper temperature, may be converted into vinegar.

Vinegar is an ancient liquor. It is mentioned in the book of Numbers, nearly 1500 years before Christ. *Hippocrates* employed it medicinally. *Hannibal* is said to have softened the rocks by fire and vinegar, in his famous passage over the Alps.

As before mentioned, different liquors are employed in the manufacture of vinegar. In the *United States, cider* is generally made use of. In *Great Britain,* the vinegar of commerce is obtained from an infusion of *malt,* or a mixture of *malt* and *raw barley.* In *France* and wine countries, it is made from *inferior wines.*

Malt vinegar is prepared from malt, or a mixture of malt and raw barley, which is mashed as in the common process of brewing, and when cooled is put into large fermenting tuns, thoroughly mixed with the proper quantity of yeast, and allowed to ferment for five or six days; it is afterwards placed in vessels of smaller capacity, and kept in rooms heated by a stove to the proper temperature, until the *acetous fermentation* is completed. It is then introduced into large tuns with false bottoms, on which are placed a quantity of the refuse of raisins, and other fruit called *rape,* which had before served for making wines. One of the tuns is filled with vinegar, (from the smaller vessels, in which it had last been put,) a second tun is only three-fourths filled — in the latter, the fermentation takes place more rapidly than the former — a portion of the vinegar is conveyed from one to the other, at regular intervals, until the process is completed, and the vinegar ready for sale.

Wine vinegar is, as before mentioned, obtained from inferior wines; it is placed in casks in a heated room, those casks being preferred which had before been employed for a similar purpose; they are placed in three rows, one above another, each having an opening of about two inches at the top; the temperature of the room must be from 68° to 75° F. The wine intended for vinegar is kept in barrels containing beech shavings, on which the lees are deposited. Twenty-two gallons of vinegar, at the boiling temperature, is put into each vinegar cask; in eight days, two gallons of the wine, drawn off clear, is added, and repeated every eight days, until the casks are filled. In about fifteen days, the vinegar is formed.

At the end of that time, half the contents only of each cask is drawn off, and again filled by the addition of two gallons of wine as at first; the intervals sometimes between the successive additions are shorter or longer, the variations depending upon the rapidity or progress of the fermentation, which is ascertained by plunging a stave into the cask; if covered with froth when withdrawn, the fermentation is supposed to be going on properly, and accordingly more wine is added.

Wine vinegar is of two kinds, *white* and *red*, according as it is prepared from white or red wine.

White-wine vinegar is preferred; it is purer, pleasanter, and keeps better than the red.

Cider vinegar is the kind generally made in this country. The cider is exposed in barrels to the heat of the sun, with the bungs open. The acetic fermentation being generally completed in from eighteen to twenty-four months. The progress of the fermentation must be watched, and as soon as good vinegar is formed, it should be racked into clean barrels, otherwise the vinegar might be spoiled by taking on the *putrefactive* fermentation.

The improved German, or quick method of vinegar-making, is, however, far superior to all the old and slow methods formerly in use, and is now being generally adopted. This process greatly enlarges the surface of the liquid exposed to the air, securing thereby the speedy oxydation of the alcohol, or its conversion into acetic acid.

"An oaken tub, somewhat narrower at the bottom than the top, from six to seven feet high and three feet in diameter, is furnished with a well-fitted, grooved, but loose cover. About half a foot from its mouth, the tub has a strong oak or beech hoop fitted to its inside surface, sufficiently firm to support a second cover, also well fitted, but movable. The space under this second cover is destined to contain the vinous liquor, and in order to bring it very amply into contact with the atmosphere, the following contrivances have been resorted to: this cover is perforated, like a sieve, with small holes of from one to two lines in diameter, and about one and a half inches apart. Through each of these holes, a wick of packthread or cotton is drawn, about six inches long, which is prevented from falling through by a knot on its upper end, while its under part hangs free in the lower space. The wicks must be just so thick as to allow of the liquor, poured above the cover, passing through the holes in drops. The edges of the lid must be packed with tow or hemp, to prevent the liquor running down through the interval.

"The whole lower compartment is now to be filled with chips of beech-wood, up to nearly the perforated cover. The liquor, as it trickles through the holes, diffuses itself over the chips, and, sinking slowly, collects at the bottom of the tub. The chips should be prepared for this purpose, by being repeatedly scalded in boiling water, then dried, and imbued with hot vinegar. The same measures may also be adopted for the tub. To provide for the renewal of the air, the tub is perforated at about a foot from its bottom with eight holes, set equally apart round the circumference, two-thirds of an inch wide, and sloping down, through which the air may enter into this lower compartment, without the trickling liquor being allowed to flow out. In order that the foul air, which has become useless, may escape, four large holes are pierced in the sieve cover, at equal distances asunder, and from the center, whose united areas are rather smaller than the total areas of the holes on the side of the tub. Into these four holes, open glass tubes must be inserted, so as to stand some inches above the cover, and to prevent any of the liquor from running through them. The proper circulation of the air takes place through these draught holes. This air may afterwards pass off through a hole of two and a half inches diameter, in the uppermost cover, in which a funnel is placed for the supply of liquor, as it is wanted to keep up the percolation.

"The temperature of the fermenting compartment is ascertained by means of a thermometer, whose bulb is inserted in a hole through its side, and fastened by a perforated cork. The liquor collected in the under vessel runs off by a siphon, inserted near its bottom, the leg of which turns up to nearly the level of the ventilating air-pipes, before it is bent outward and downward. Thus the liquor will begin to flow out of the under compartment only when it stands in it a little below the sieve cover, and then it will run slowly off at the inclined mouth of the siphon, at a level of about three inches below the lower end of the glass tubes. There is a vessel placed below, upon the ground, to receive it. The tub itself is supported upon a wooden frame, or a pier of brick work, a foot or eighteen inches high. A tub constructed like the above is called a *graduation vessel,—vinegar generator.* (*Essig-bilder.*) It is worked in the following way:—

"The vinegar-room must be, in the first place, heated to from 100° to 110° Fahr., or till the thermometer in the graduation vessel indicates at least 77°. The heat may then be modified. We now pour through the uppermost cover of the tub a mixture, warmed to 144° Fahr., of 8 parts of proof-spirits, 25 parts of soft water, 15 parts of good vinegar, and as much clear wine or beer. The water should be first heated, and then the vinegar, spirits, and wine or beer may be added to it. Of this mixture, so much should be poured in as is necessary to cover over the second lid two or three inches deep, with the liquor; after which the rest may be poured slowly in as it is wanted.

"When the liquor has run for the first time through the graduation vessel, it is not yet sufficiently *acidified;* but the weak vinegar collected in the exterior receiving cisterns must be a second time, and, if need be, a third time, passed through the graduation tub, in order to convert all the *alcohol* into *acetic acid.* In general, we may remark that the stronger the vinous liquor, the more difficult and tedious is its conversion into vinegar, but it is so much the stronger. To lessen this difficulty somewhat, it would be well not to put all the spirits at first into the wash, or mixed liquors, but to add a little more of it at the second and third running, especially when we desire to have very strong vinegar. After the *graduation vessel* has been some days at work, it is *no longer necessary* to add vinegar to the mixture of spirits and water, since the sides of the graduation tub, the beech chips, and the pack threads, are all impregnated with the ferment, and supply its place. The mixture must, however, be always maintained at the temperature of 100°.

"Instead of the above mixture of proof-spirits, water and wine, *we may employ*, according to Dingler, a clear fermented *wort* of *malt*, mixed with a *little* spirits. The perfect vinegar which collects in the receiving cistern may be immediately racked off into the store casks *for sale*.

"It has been objected to this process, that in consequence of the mixture of saccharine and glutinous materials which are contained in beer or worts, along with the acetous fermentation, there is also partially a vinous fermentation, and much carbonic acid thereby disengaged, so as to obstruct the acetification. This obstruction may be remedied by a freer circulation of air, or by the exposure of quicklime in the chamber. It is a more substantial objection that, from the addition of beer, etc., more lees or dregs are deposited in the graduation tub, whereby a more frequent cleansing of it, and of the beech chips, with a loss of time and vinegar, becomes necessary. The only mode of obviating this difficulty is, to take well-clarified fermented wash.

"Another evil attendant on the quick process is, the evaporation of the spirituous liquors. Since, in the graduation tub, there is a temperature of 110°, it is impossible to avoid a loss of spirit from the circulation and efflux of the air. The air, indeed, that issues from the top hole in the uppermost cover, might be conducted over an extensive surface of fresh water, where its spirit would be condensed in a great measure. But, after all, this fear of great loss is, I believe, *groundless;* because the spirit is rapidly acidified by the oxygen of the air, and thereby loses its volatility.

"The supply of the warm wash should be drawn from a cistern placed near the ceiling, where the temperature of the apartment is hottest; and it may be replenished from the partly acetified liquor in the cistern on the floor.

"With this view, two cisterns should be placed above, so that one of them may always contain liquor sufficiently hot, and thus the process will suffer no interruption.

"When malt wash is used for this quick process, the resulting vinegar must be clarified in a tun with beech chips, as above described. In two or three days the impurities will be deposited, and the fine vinegar may be racked off. The following prescription for preparing what he calls malt wine, is given by Dr. Kastner:—'Eighty pounds of pale barley-malt, and 40 pounds of pale wheat-malt, are to be crushed together. These 120 pounds are to be infused with 150 quarts of water, at the temperature of 122° Fahr., afterwards with 300 quarts of boiling water, and the whole body is to be mashed thoroughly, till all the lumps disappear. It is then to be left at rest in a large covered tub, for two or three hours, to allow the grains to settle down, from which the wort is to be drawn off. When it has fallen to the temperature of 64°

Fahr., 15 pounds of good yeast are to be stirred in, and it must now be left for two or three days to ferment, in a loose-covered tun. When the *vinous* fermentation has taken place, the clear liquor must be drawn off by a tap-hole, a little above the bottom, so as to leave the lees and scum in the tun.' This malt wine, he adds, may be kept for a long time in close vessels, and is always ready for making *quick vinegar*." (*Ure.*)

Vinegar can be manufactured cheaper by this method than by any of the old systems. By increasing the size of the graduation vessel, both in heighth and diameter, vinegar is still more rapidly formed, owing to the increased enlargement of the surface of the liquid exposed to the oxygen of the air.

OTHER VINEGARS.

Raspberry Vinegar.—Macerate two pounds of fresh raspberries, with a pint of the best vinegar, for fourteen days, and strain; or, to a quart of raspberry juice add two ounces of strong acetic acid, or enough to render it sufficiently acid.

Raspberry Vinegar.—Bruised ripe raspberries and white-wine vinegar, of each 2 quarts; macerate twenty-four hours, press, strain, and to each quart add 2 pounds of white sugar; boil, skim, cool, and to each quart add 4 ounces of brandy.

Camp Vinegar.—Take 12 chopped anchovies, 2 cloves of garlic, minced, 1 drachm of Cayenne, 2 ounces of soy, 4 ounces of walnut catchup, and a pint of the best vinegar; digest for a month, and strain.

Camp Vinegar.—Vinegar a quart, walnut catchup a pint, mushroom catchup 3 tablespoonsful, garlic 4 heads, Cayenne ½ ounce, soy 2 tablespoonsful, port wine 2 glasses, 3 anchovies, and a tablespoonful of salt; put them into a bottle, shake daily for a month, and decant.

Tarragon Vinegar.—Put fresh tarragon leaves into a stone jar, and pour on them a sufficient quantity of the best wine vinegar to cover them. Set the jar in a warm place for fourteen days; then strain through a jelly-bag.

Curry Vinegar.—Infuse 12 ounces of curry powder in a gallon of vinegar, near the fire for five days. Used as a flavoring.

Seville Orange-peel Vinegar.—Seville Orange-peel ½ pound, vinegar 1 gallon; leave stand fourteen days, and strain.

Ginger Vinegar.—Bruised ginger-root ¼ pound, vinegar 3 quarts; macerate for fourteen days; strain.

French Raspberry Vinegar.—Take 6 quarts raspberries, mash them, press out the juice; to each pint of the juice add one half pound of white sugar, and a half pint of the best cider-vinegar, first, however, mixing the juice and the vinegar, and giving them a boil in a kettle; after boiling add the sugar gradually, with a beaten white of egg to every two pounds; and boil and skim it till the scum ceases to rise. When cool, bottle and cork tightly. To use it, pour out half a tumblerful and fill it with ice-water.

Argol Vinegar.—White argol or cream of tartar ½ pound, boiling water 4 gallons; dissolve, cool, add ¾ gallon proof-spirits, and keep it lightly covered in a warm place.

German Family Vinegar.—Soft water 15 gallons, brown sugar 4 pounds, cream of tartar

¼ pound, corn-spirit 2 gallons; mix, keep it lightly covered, in a warm temperature.

Sugar Vinegar.—Boil 10 gallons of water for ten minutes with a quart of bran, run it into a tub through funnels, and put into it 12 pounds of coarse brown sugar, and when cooled to 70°, add a quart of yeast at three different times. Let it work for four days, then take off the yeast, and run the liquor into a clean tub. Fill the tub nearly with the liquor, leaving room for 2 pounds of bruised crab-apples, and 1 pound of raisins. If it ferments, add a little reserved liquor, or water boiled with sugar, till the fermentation ceases. Then place the cask upon a plank fronting the sun in summer, and near the fire in winter. Put into it 1 ounce of isinglass, well beaten up with a quart of old vinegar; cover the bunghole with a piece of hop-bag, (fastened to the edge of the hole by pitch,) and lay a tile over it. Leave it in this state until it becomes fit for use.

Chilli Vinegar.—To 1 quart of the best vinegar add 100 English chillies, cut or bruised, (or ½ pound Cayenne pepper;) digest for fourteen days.

Horse-radish Vinegar.—To 3 ounces of the scraped root, 1 ounce of minced shallots, and 1 drachm of Cayenne pepper, add a quart of vinegar; let stand for fourteen days.

BITTERS.

Bitters are very much used at the present time as additions to spirituous and vinous liquors, as likewise also for the purpose of giving strength and vigor to the body; and, when repeated at proper intervals, a permanent healthy tone *is* induced. *Bitter extractive* appears to be the active tonic principle,—found in a great variety of vegetable productions; which, as a general thing, are combined in certain proportions, with aromatics, rendering their infusions and tinctures more pleasant, though at the same time more stimulating. Dr. Paris says: "We are ourselves conscious of the invigorating effects of slight bitters upon our stomach; and their presence in malt (or vinous) liquors, not only tends to diminish the noxious effects of such potations, by counteracting the indirect debility which they are liable to occasion, but even to render them, when taken in moderation, promoters of digestion. The custom of infusing bitter herbs in vinous drinks is very ancient and universal; the *poculum absinthiatum* was regarded in remote ages as a wholesome beverage, and the wormwood was supposed to act as an antidote against drunkenness. The Swiss peasant cheers himself amid the frigid solitude of his glaciers, with a spirit distilled from *gentian*, the extreme bitterness of which is relished with a glee that is quite unintelligible to a more cultivated taste."

The formulæ for bitters are very numerous. We give those which we have found to be the best,—most pleasant; and which have rendered to the consumers the most satisfaction. If a small quantity only is wanted, reduce the quantities of the ingredients in a proportionate ratio; if a large quantity, increase in the same manner.

IMITATION WINE BITTERS.

No. 1.—WINE BITTERS.

8	ounces dried orange-peel.
8	ounces bruised gentian root.
6	ounces unground cinnamon.
2	drachms ginger root.
8	ounces bruised cochineal.
2	gallons proof-spirits.
1½	gallons water.
1	pound loaf-sugar.

Digest for fourteen days; decant the clear liquor, and filter if required.

No. 2.—WINE BITTERS.

½	pound bruised gentian.
½	pound orange-peel.
2	ounces cassia bark.
¼	pound lemon-peel.

¼ pound bruised columbo root.
4 ounces red sanders.
1 pound loaf-sugar.
2 gallons proof-spirits.
1 gallon water.

Digest fourteen days; decant the clear liquor, and filter if required.

No. 3.—WINE BITTERS.

½ pound wild-cherry bark.
2 ounces canella bark.
¼ pound red sanders.
1 ounce bruised cardamom seed.
1 pound bruised gentian.
2 gallons pure spirits.
1 gallon water.

Digest fourteen days; decant, and filter if necessary.

No. 4.—WINE BITTERS.

4 pounds orange-peel.
4 pounds bruised gentian root.

6 pounds red sanders.
4 pounds wild-cherry bark.
½ pound cochineal, bruised.
$\frac{10}{16}$ pound cannella bark.
¼ pound bruised cardamom seed.
1 pound Virginia snake-root.
1 pound powdered gum kino.
12 gallons pure proof-spirits.

Digest three or four weeks; draw off as required, filling up from time to time, until the strength is so much exhausted as to require new ingredients. What is drawn off may be reduced with water to the desired strength; adding a little loaf-sugar. A large quantity may be obtained in this manner. The above is a fine receipt, producing a splendid article.

The ingredients may be increased or diminished to please the fancy of the maker; insuring thereby a larger or smaller quantity of bitters.

BRANDY BITTERS.

No. 5.—BRANDY BITTERS.

2 ounces bruised gentian.
2 ounces dried orange-peel.
1 ounce cassia bark.
1 pound loaf-sugar.
2 gallons brandy.

Digest for twelve days, agitating frequently; filter through paper, then add the sugar.

No. 6.—BRANDY BITTERS.

¼ pound wild-cherry bark.
¼ pound orange peel.
¼ pound bruised gentian.
1 ounce canella bark.
1 ounce Virginia snake-root.
2 ounces red sanders.
4 gallons of brandy.

Digest fourteen days, agitating frequently; then draw off the clear liquor, adding 2 pounds loaf-sugar.

No. 7.—BRANDY BITTERS.

½ pound bruised gentian.
1 ounce cinnamon, broken.
1 drachm cloves.
1 ounce red sanders.
½ pound lemon-peel.
2 gallons brandy.

Digest ten days, shaking frequently; decant the clear liquor, and add 1 pound loaf-sugar.

SPIRIT BITTERS.

No. 8.—SPIRIT BITTERS.

4 ounces cinchona bark.
2 ounces canella bark.
4 ounces bruised columbo.
½ pound orange-peel.
1 ounce red sanders.
1 drachm cloves.
2½ gallons pure spirits.

Digest fourteen days, agitating frequently; decant the clear liquor, and add 1 pound loaf-sugar.

No. 9.—SPIRIT BITTERS.

½ pound bruised gentian.
½ pound orange-peel, dried.
1 ounce cassia bark.

¼ pound wild-cherry bark.
1 ounce bruised cochineal.
1 ounce red sanders.
3 gallons pure spirits.

Digest fourteen days, frequently agitating; decant the clear liquor, and add 2 pounds loaf-sugar.

No. 10.—SPIRIT BITTERS.

⅛ pound bruised gentian.
⅛ pound orange-peel.
⅛ pound wild-cherry bark.
⅛ pound calamus.
⅛ pound chamomile blossoms.
⅛ pound bruised cardamom seed.
¼ pound red sanders.
1 ounce canella bark.
⅛ pound Virginia snake-root.
¼ pound columbo root, bruised.
5 gallons spirits.

Digest for fourteen days, frequently shaking; decant the clear liquor, add 2 pounds loaf-sugar.

A few gallons of spirits may then be put over the ingredients, and drawn off in a few weeks, as before.

No. 11.—SPIRIT BITTERS.

2 ounces bruised columbo root.
1 ounce cassia bark.
1 ounce orange-peel.
1 ounce red sanders.
1 gallon spirits.

Digest for ten days, draw off, and add half a pound of loaf-sugar.

No. 12.—SPIRIT BITTERS.

2 ounces bruised gentian.
2 ounces chamomile blossoms.
1 drachm cloves.
2 ounces lemon-peel.
1 ounce red sanders.
1½ gallons spirits.

Digest ten days, as before, and decant the clear liquor.

IMITATION LEMON SIRUP.

1. *Lemon Sirup.*—Citric acid 1½ ounces, sugar 6 pounds, pure soft water 4 quarts; dissolve the sugar in the water with the aid of heat, then add the acid, previously dissolved in a small quantity of water; agitate thoroughly. When cool, bottle. For use, take two tablespoonsful of the sirup in a tumbler, fill with ice-water. A fine summer drink. Color, if desirable.

2. *Lemon Sirup, Aromatic.*—Same as No. 1, only adding, before bottling, any aromatic tincture or sirup, the flavor of which you desire, using in the same manner as the first. Color, if required.

Lemonade, Acidulated.—Juice and thin peel of 1 lemon, citric acid 1 drachm, sugar three ounces, boiling water a quart. It may be varied by substituting for the sugar, sirup of raspberries, strawberries, or other fruits.

French.—Sirup of citric acid 2 ounces, water a quart, spirit of lemon-peel a teaspoonful.

Imperial.—Cream of tartar 1½ drachms, a slice of thin lemon-peel, a lump of sugar; pour on them a quart of boiling water; strain when cold. A cooling drink.

Queen Cup.—Fresh lemon-juice 4 ounces, fresh lemon-peel (thinly peeled) ½ ounce, white sugar 4 ounces, boiling water 3 pints; strain when cold.

ORANGEADE, OR SHERBET.

1.—Juice of 4 oranges, thin peel of 1 orange, lump sugar 4 ounces, boiling water 3 pints.

2.—Juice and peel of 1 large orange, citric acid ½ drachm, sugar 3 ounces, boiling water a quart.

Effervescing Orangeade, or Sherbet.—1. Put into a soda-water bottle ½ ounce to 1 ounce of sirup of orange-peel, 30 grains of bicarbonate of potash, 8 ounces of water, and lastly, 40 grains of citric acid in crystals, and cork immediately.

2. Put into each bottle 2 or 3 drachms of sugar, 2 drops of oil of orange-peel, 30 grains of bicarbonate of potash, or 25 grains of bicarbonate of soda; water to fill the bottle, and 40 grains of citric acid as before.

FORMULÆ.

Formulæ for the preparation of the *tinctures*, *essences*, etc., used in the different *imitations* as recommended in this work:—

TINCTURES.

1. *Tincture Kino.*—Kino in powder 3½ ounces, rectified spirits 2 pints. Macerate for fourteen days, and filter through paper.

2. *Tincture Rhatany.* — Rhatany, ground, 6 ounces, diluted alcohol 2 pints. Macerate for fourteen days, and filter through paper.

3. *Tincture Catechu.*—Catechu 3 ounces, diluted alcohol 2 pints. Macerate for fourteen days, express, and filter through paper.

4. *Tincture Cloves.*—Bruised cloves 2 ounces, alcohol 2 pints. Macerate for fourteen days, and filter through paper.

5. *Tincture Cinnamon.*—Cinnamon, bruised, 3 ounces, diluted alcohol 2 pints. Macerate for fourteen days, and filter through paper.

6. *Tincture Allspice.*—Allspice 2 ounces, alcohol 2 pints. Macerate for fourteen days, and filter through paper.

7. *Tincture Cardamom Seed.*— Cardamom, bruised, 4 ounces, diluted alcohol 2 pints. Macerate for fourteen days, and filter through paper.

8. *Tincture Red Sanders.* — Red sanders 6 ounces, alcohol 2 pints. Macerate for fourteen days, express, and filter through paper.

9. *Tincture of Saffron.*—Saffron, cut fine, 2 ounces, proof-spirits 2 pints. Macerate for fourteen days, and filter through paper.

ESSENCES.

1. *Essence of Lemon.*—Pure oil of lemon 1 ounce, strongest alcohol ½ pint, exterior rind of lemon ½ ounce. Macerate two days, and filter.

2. *Essence of Orange-Peel.*—Orange-peel 3½ ounces, strongest alcohol 2 pints. Macerate fourteen days; filter through paper.

3. *Orange-Flower Water.*—Orange flowers 10 parts, water 30 parts. Distill 20 parts.

COLOR.

Beet-Root Color.—Extract by boiling.

SIMPLE SIRUP.

Simple Sirup.—Best white sugar 2 pounds, water a pint. Dissolve the sugar in the water with the aid of heat; remove any scum that may rise; the moment it boils remove, and strain while hot.

COLORING FOR LIQUORS.

TAKE 4 pounds of best white crushed or lump sugar, put it into a kettle that will hold five quarts, with a half pint of water. Boil it until it is *black*, then remove it from the fire and cool with water, stirring it as you put in the water. Use, to color liquors from a *light amber* to a *dark brown*. For brandies, whiskey, old rye, etc.

Red Color.—Beet root, red sanders, or cochineal.

Port-Wine Color.—Extract of rhatany.

BEAD FOR LIQUORS.

ONE ounce of oil of vitriol, and one half ounce of sweet oil, mixed together in a glass bottle. One drop is sufficient for a quart, and in proportion for a larger quantity.

THE END.

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